BUTANE-PROPANE News

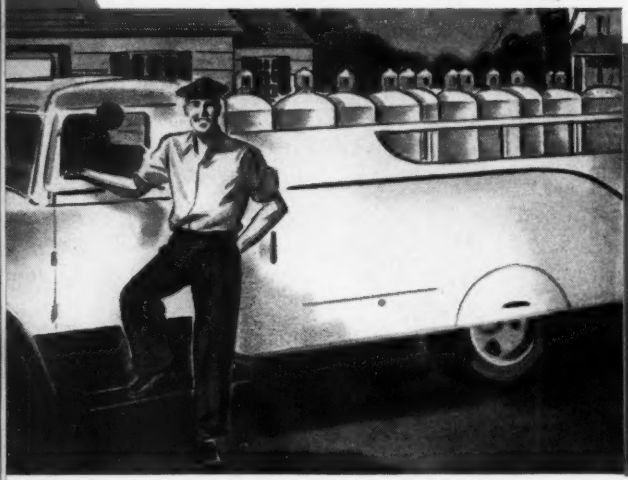
25¢

JOHN CRER
JUL 3 1942

JULY
1942

"United We Stand"

LIGHT WEIGHT MAKES HACKNEY CYLINDERS EASIER TO HANDLE



HACKNEY BUTANE-PROPA

CYLINDERS

Because of their comparative light weight, Hackney LP-Gas Cylinders are easier, faster and safer to handle—provide low-cost transportation.

Adequate strength, too, has been built into these durable cylinders—maximum protection is assured. In the construction of Hackney cylinders, there is only one circumferential body weld, X-ray controlled. Cold drawing by the special Hackney process assures uniform sidewall thickness and acts as a check on the quality of steel itself. To further improve the physical properties all Hackney cylinders are heat-treated after complete fabrication. Long life is assured.

Because of these and many other advantages, Hackney LP Gas Cylindyers have enjoyed a widespread preference for years. Hackney engineers have an intimate knowledge of all types of metals and are thoroughly versed in users' requirements. Hackney facilities and manufacturing equipment are completely modern. Today, metals are more difficult to obtain, but there is no interruption in skill, knowledge, imagination and Hackney's research in product improvement. In their continuance, is your assurance of the continued superiority of Hackney Cylinders.

Hackney MILWAUKEE

PRESSED STEEL TANK CO.

General Offices and Plant:

1487 South 66th Street Milwaukee, Wisconsin

Containers for Gases, Liquids and Solids

THERE ARE NO PRIORITIES ON PROGRESSIVE THINKING!

N times of emergency, such as these, there is little incentive or opportunity for the erage manufacturer to develop new lines or build improvements into existing products. nprecedented wartime demands are not con- ucive to immediate progress within the quipment industry. But there is the oppor- nity for some good solid thinking on what n be done when the emergency is over.

The Engineering, Research and Develop- ent Departments of the Pittsburgh Equitable eter Company and Merco Nordstrom Valve ompany are thinking ahead of the times. On e drawing boards new designs are taking rm. In the laboratories, experimental models e being put through their paces. Scarcity of aterials and priority controls will prevent the immediate introduction on these develop- ments. *But there are no priorities on progres- sive thinking.* With the ultimate return to normal, the results of today's research will be apparent in tomorrow's equipment.

This organization, with its unexcelled fa- cilities for research and development, includ- ing fellowships at a world renowned scientific institute, is contributing valuable aids to the Nation's war efforts.

In peace or at war, continuous research goes forward to assure that the technical de- velopments of the future, be they designs, materials or methods, will be incorporated in EMCO LPG Meters and Regulators, Pittsburgh Liquid Butane-Propane Meters and Nordstrom Lubricated Plug Valves.

PITTSBURGH EQUITABLE METER COMPANY

NEW YORK · BROOKLYN · DES MOINES · MEMPHIS · OAKLAND · TULSA · CHICAGO · BOSTON

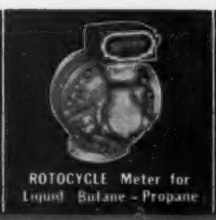
MERCO NORDSTROM VALVE COMPANY
Main Offices, Pittsburgh, Pa.
NATIONAL METER DIVISION, Brooklyn, N. Y.

KANSAS CITY · PHILADELPHIA · SAN FRANCISCO · LOS ANGELES · SEATTLE · HOUSTON · COLUMBIA · BUFFALO

utane Propane
er Meter

EMCO Large Capacity
Pressed Steel Gas Meter

EMCO Type "B"
Ejector Service Regulator



ROTOCYCLE Meter for
Liquid Butane - Propane

NORDSTROM
Lubricated Plug Valve

BUTANE-PROPANE News

Reg. U. S. Pat. Off.

Contents for July 1942

Letters	4
Guest Editorial: Providing Service—With Pay *By Louis Abramson, Jr.*	7
Mainly Beyond the Mains	9
1941 Domestic Sales Up 65%—Total Volume Gains 48%	12
LP-Gas Industry Orders	15
Latest News from Washington	17
E. Holley Poe Heads OPC Division	21
L.P.G.A. Elects Executive Board	21
The Bottled Gas Manual—Chapter 12 *By C. C. Turner*	22
Army Camp LP-Gas Needs Boost 1941 California Sales	42
Butane Power	47
Jap and Insect Invasions Both Look Alike to Butane Sprayers	47
To Defeat Air Attack Dangers Learn How to Extinguish Bombs	50
Research	53
Exceptions Are Being Granted	60
Texans Vote Delivery Restrictions	64
Classified	78
Advertisers	80

Publication Office

Los Angeles—1709 West Eighth Street. Phone: DRexel 4337.

Branch Offices

Dallas, Texas—3645 Haynie Avenue. Phone: Justin 8-1764.
Chicago—1064 Peoples Gas Building. Phone: HARrison 6634.

JAY JENKINS, Publisher and General Manager.
CRAIG ESPY, Vice President. **ARTHUR ROHMAN,** Vice President.
JAMES E. JENKINS, Secretary-Treasurer.
LYNN C. DENNY, Managing Editor. **ELLIOTT TAYLOR,** Eastern Editor.
PAUL F. LADY, Advertising Manager.
J. BREWER AVERY, Promotion and Research. **DOYLE H. JAY,** News.
W. G. RUSSELL, Field Representative.

July, 1942. Volume 4, Number 7. BUTANE-PROPANE *News* is published monthly.

Copyright 1942, by Western Business Papers, Inc.,

at 1709 West Eighth Street, Los Angeles, California.

Subscription price: United States, Mexico, Cuba, South and Central American countries (in advance), 25 cents the copy, one year $1.50; three years for 2.50; all other countries $3.00 per year. Entered as second-class matter May 29, 1939, at the post office at Los Angeles, California, under the Act of March 3, 1879.

Member Audit Bureau of Circulation; Associated Business Papers, Inc.
Publishers: **GAS,** The *Natural* Gas Magazine; **HANDBOOK BUTANE-PROPANE GASES.**

Look to past sales for today's profit

Adjusting an automatic oven heat-control on a Caloric gas range

No — you can't sell many new ranges. But how about the ranges you have sold in the past? Many of them need adjustments, repairs or replacement parts. And maintenance of this older equipment is not only vital, but *profitable*.

Caloric stands ready to give you all possible help in expanding your service. We can supply parts for Caloric models — as listed in our Catalog of Parts. And we shall gladly answer any inquiry about the servicing of Caloric Ranges that will help your service men help your customers.

CALORIC
GAS RANGES

CALORIC GAS STOVE WORKS • PHILADELPHIA, PA.

LETTERS

Gentlemen:

I have between 500 and 600 customers. I own all of the tanks and equipment. Now, if one of my customers moves away I naturally pick up my tanks, but am I allowed to transfer them to new customers or do I have to store them away? Please advise as soon as possible.

A. E. L.

California

Your problem comes under industry order No. L-86 which provides that if your containers were installed before April 1, 1942, and removed after that date you may re-install them. There are several other conditions under which you may be able to utilize such equipment. You can obtain authority to make installations in government housing projects for war workers; in projects necessary to promote the war effort and in the interest of public interest and welfare, and by special permission from the Director of Industry Operations, War Production Board. You may also exchange refilled containers for those that have been emptied by existing users.

The amended Limitation Order L-79, dated May 23, permits installations of cooking and heating appliances in homes which have no gas equipment providing no less vital equipment is available; in buildings started after July 31, 1941, but before April 10, 1942, and in new and remodeled buildings under special authority of the Director of Industry Operations. As such appliances would be worthless unless gas were made available it may be assumed that cylinders and tanks may be installed under such circumstances.

Form PD-397 must be used in applying for exceptions to L-86 and installations under L-79 must be preceded by applications from prospective users, whose needs meet the limited conditions imposed.

You should have copies of all industry orders and forms for ready reference.—Ed.

●

Gentlemen:

I have recently bought a tractor equipped with apparatus for using butane. In order to get the best service out of my tractor I would like to get as much information as I can about butane operation on such engines. If you have any literature on the subject, please let me know.

R. C.

California

We are sending you tear sheets of several important articles which have appeared in back issues of BUTANE-PROPANE *News* on the subject of converting gasoline engines to use butane, and these should be helpful to you. If you will review the advertisers in our magazine you will find several who make butane carburetors and other special equipment for such conversions.—Ed.

●

Gentlemen:

In the March issue of your magazine you make reference to an article entitled "Present Status of Synthetic Rubber" by E. R. Bridgwater. Will you please tell me where I can get a copy of that article?

R. E. C.

California

The article referred to was published in *Industrial and Engineering Chemistry* in the November, 1941, issue. That magazine is published by the American Chemical Society, 332 W. 42nd St., New York.—Ed.

●

Gentlemen:

We were immensely pleased with the way Grand Ranges were received in the outlying territory where butane or propane gas is prevalent. We can truthfully say that because of BUTANE-PROPANE *News* covering the outlying areas, it has been tremendously helpful to us in introducing Grand Ranges.

Listenwalter & Gough
Los Angeles, California

Gentlemen:

Please rush all available information for any army draft exemption for owner and service man in case of straightening out newly acquired LP-Gas dealer business.

G. R.

Ohio

We understand that there are no draft exemptions for any gas company employe.—Ed.

•

Gentlemen:

Please tell me the number of feet of vapor per pound; the number of feet per gallon, and the number of pounds per gallon of butane and propane.

W. W. C.

Illinois

You will find in the following table the answers to your inquiry:

	Propane	Butane
Cu. ft. of vapor per lb. of liquid—at 60°F. and 30 in. mercury.	8.588	6.5154
Cu. ft. of vapor per gal. of liquid — at 60° F. and 30 in. mercury.	36.398	31.602
Lbs. per gal of liquid —at 60° F.	4.2383	4.8544

These figures appear in the *Handbook Butane-Propane Gases*, published by us.—Ed.

•

Gentlemen:

We understand that some towns are using air raid horns that are operated on propane gas. Can you tell us about them?

F. F.

Idaho

The April issue of BUTANE-PROPANE *News* (Page 26) carried a complete story about the operation of warning horns with propane. A drawing, showing method of installation, and the equipment required are given.—Ed.

•

Gentlemen:

The writer is very much interested in butane and propane air mixture plants and supplying cities with this type of gas. Does your publication deal with this kind of plant and distribution?

J. E. C.

Texas

The best source for technical data concerning town plants and the distribution of LP-Gases by underground mains is the *Handbook Butane-Propane Gases*, published by Western Business Papers, Inc., 1709 W. 8th St. Los Angeles.—Ed.

•

Gentlemen:

Some time ago we saw a story in your magazine describing the use of butane-fired brooders for baby chicks. We will appreciate knowing the names of manufacturers of this type of equipment.

C. J. D.

Louisiana

The following companies manufacture chicken brooders: A. R. Wood Manufacturing Co., Santa Cruz, Calif.; H. W. Hart Manufacturing Co., 2636 Humboldt St., Los Angeles, Calif.; Oaks Manufacturing Co., Inc., Tipton, Ind.—Ed.

•

Gentlemen:

Can you give us the name of any firm that makes a gas iron?

H. G. A.

South Dakota

We do not know of any firm manufacturing gas irons. Will some of our readers supply this information? Address BUTANE-PROPANE *News*, 1709 W. 8th St., Los Angeles, Calif.—Ed.

•

Gentlemen:

BUTANE-PROPANE *News* is the best piece of literature ever offered for the money. Don't see how you can do it. Renew my subscription.

R. C. Keeney

Fairhope, Alabama.

•

• **BUTANE-PROPANE *News* welcomes letters from our readers, but it must be understood that this magazine does not necessarily concur in opinions expressed.—Editor.**

LOUIS ABRAMSON, JR.

Guest Editor for July

Providing Service--With Pay

By LOUIS ABRAMSON, JR.

President, Petrolane Gas Corporation, New Orleans

IN this day and time, as we all concentrate our thoughts and energies upon the one important consideration before us—that of winning the war—the thought of "profit" in business, in the old, pre-war sense seems oddly out of place.

Our first consideration must be to serve any of the armed forces in our areas of operation. Secondly, we must make every effort to keep supplied the farms, dairies, hospitals, shipyards, and other institutions which further national safety and health. After these, we come to our private consumers who depend upon us for their fuel needs, and whose healthful living we must attempt to maintain.

Fulfillment of these obligations and remaining solvent can only be accomplished by stripping for action; by doing away with all extravagances and unnecessary expenses, and by demanding the cooperation of the consumer in our efforts to continue in operation.

If we can't sell any more tanks or appliances, except as government orders permit, then we can carry a service organization only if it can receive sufficient income to justify its existence.

There is reason to believe the public is aware of the reasons for paying for necessary service, as it does in all other industries. The LP-Gas distributor, however, has spoiled his customers in the past in his efforts to build volume, and so free service has been used as a bait or an added sales attraction.

Now there is evidence of a strong trend the other way. Through necessity, dealers are seeing the wisdom of making reasonable charges for service. It is a good sign that our industry is putting its business in order, and this will help not only to solve many financial problems during this emergency, but will give us a sounder foundation to build upon later.

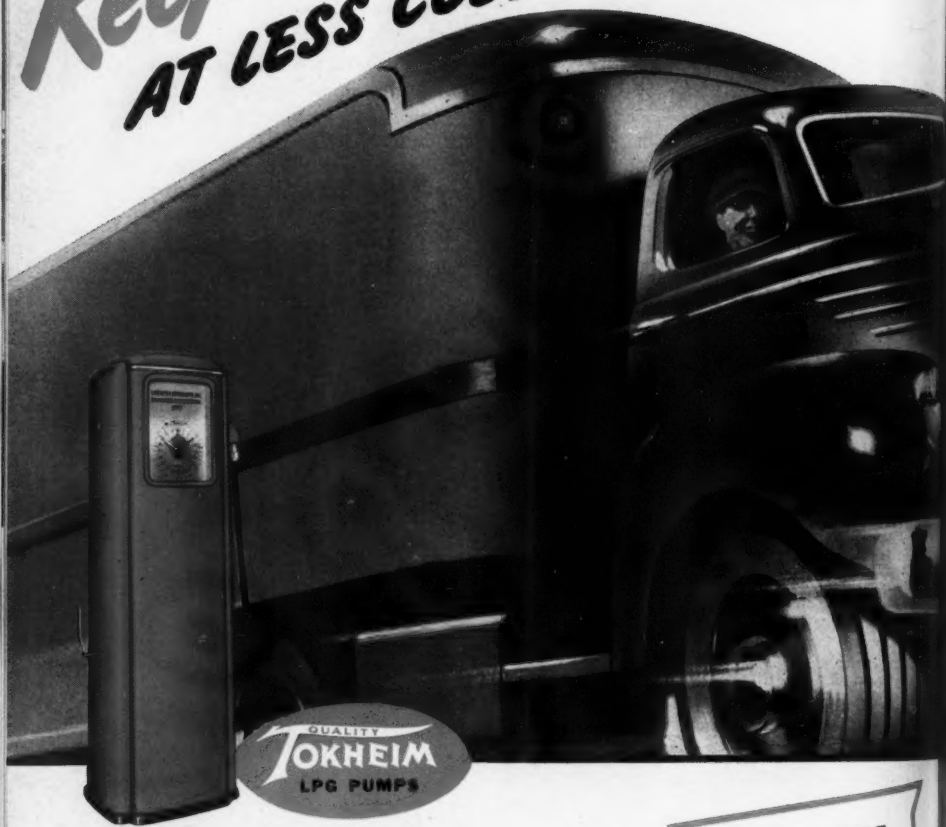
Restrictions which, because of very intensive war efforts, have been placed on our industry, and properly so, have provided a stimulating effect in making every member in the South, and no doubt elsewhere, as well, re-orient his whole outlook, examine his affairs more closely, and determine exactly what seems to be necessary for him to do in order to survive.

The answer is reasonably simple: Gas deliveries may still be made, and these will carry an entire business many times.

All-in-all, I feel that the necessity of slowing down the very rapid expansion of our business and consolidating our position is one for which we will, in later years, be extremely thankful.

Keep Them Rolling

AT LESS COST PER MILE!



★ 1942 demands utmost operating economy for your own and your customers' trucks, busses, tractors, and delivery cars. And you can keep them rolling at less cost per mile when Tokheim LPG Pumps and Metering Units are on the job. All models, rugged and efficient, are equipped with patented differential controls and positive piston displacement type measuring units—assuring rapid delivery and absolutely accurate measurement under all conditions. Special "dead man" control guarantees safe operation. Write for literature.

OUR DEFENSE ASSIGNMENT

Manufacturing various ammunition components to the infinite degree of accuracy required by government specifications.

TOKHEIM OIL TANK & PUMP CO.

GENERAL PRODUCTS DEPARTMENT

FORT WAYNE INDIANA

MAINLY BEYOND THE MAINS

Service Rendered

The official report of the Bureau of Mines on the sales of LP-Gas for 1941 comes, as it does every year, in the nature of an anti-climax since the annual estimates of "Butane-Propane News" and G. G. Oberfell have come to be regarded in the industry as the practical working estimates of each year's activities. Yet it is interesting to note that the government figures for the current year are in excess of both of these estimates, as optimistic as they may have seemed at the time of their release. With a total 462,852,000 gallons sold, the industry is shown to have registered a 48% gain for 1941 over the 1940 total of 313,456,000 gallons.

All of the principal demands for butane and propane showed important gains during the year, with domestic requirements up 65% over the 1940 level, as compared to a 53% expansion in 1940 over 1939. As an industrial fuel the official tabulation shows an increased demand of 41% compared with only 12% for the year 1940 over 1939.

Of course, it goes without saying that these figures, in the light of new emergency conditions are almost ancient history, and while it is reasonable to assume that the sales for 1942 will again exceed those for the preceeding year, the bulk if not all of the increase will be in the form of new industrial demand for fueling the accelerated expansion of the essential war industries.

While all of us recognize the necessity, none views with enthusiasm the grim business of subordinating all normal activity to the exigencies of war. Yet we cannot but feel that in many respects the industry is fortunate in having had the opportunity to bring its load up to a self-sustaining basis before the state of the emergency became so dire as to require the sacrifices that are currently being made.

It may be argued, and rightly, that the expansion of 1941 was accomplished prior to the time when governmental regulations and restrictions made themselves felt. But, whereas, as recently as 60 days ago it was feared in many quarters that these restrictions would make the continuance of normal business increasingly difficult if not indeed impossible, there prevails now in informed circles a feeling that

a measure of restrained optimism is justified.

In the first place, under the direction of John F. Steele, Chief of the LP-Gas Section of the Plumbing and Heating Branch of WPB, there has been introduced into official Washington thinking the realization that the fullest participation of the industry in the war program cannot be evoked by summarily disrupting all of the essential normal activities of its thousands of operators. As a result, there have been written into the various orders affecting LP-Gas, provisions looking to the safeguarding of the existing load, not only by allowing the delivery of gas but by permitting the repair and maintenance of all existing equipment. Other industries, threading their way through the mystic maze of Washington's devious and sometimes incomprehensible thinking have looked with envy on the simplicity and the liberality of the LP-Gas restrictions.

In a large measure this liberality has been due to the understanding and cooperative liasion that has existed between the Liquefied Petroleum Gas Association and the War Production Board. From the outset the activities of Association Secretary Frank Fetherston have been predicated on the belief that it was both practically feasible and morally sound to not only obey the law, but to assist in every way possible in furthering its major objectives. The result has been that where flagrant hardships were apparent they have been mitigated, and the chief of the LP-Gas Section has turned to industry experience for technical guidance and practical counsel on matters affecting the functioning of the industry.

Despite official disclaimers, we are of the opinion that current activities in Washington are based on a hope that even may be growing into confidence that the end of the war may be much closer than any predictions of last winter would have countenanced. The growing tendency to subordinate plant expansions to the immediate production of expendable munitions and war equipment is an indication of this trend. For the immediate future, of course, this will result in a still greater conversion of all existing manufacturing facilities to war products. This conversion will mean the practical drying up at the source of all of the materials and equipment that go into the distribution, sale and use of LP-Gas.

But if the end product is a more speedy victory, no one can deny its advisability; and the long range effect on all industry will be infinitely less disasterous than would be the gradual rebuilding of all industrial activity into the pattern of a semi-permanent war economy.

For the right to continue to

serve its existing consumers, for the opportunity to participate in the great common cause of freedom, and for the justifiable expectation of continuing its phenomenal progress after victory has been gained, the LP-Gas industry, even in these troubled times, has every reason to be profoundly thankful.

Industry Inventory

On the Plumbing and Heating Branch of the WPB now rests the responsibility not only of enforcing restrictions on the LP-Gas industry, but of initiating and carrying through the necessary measure to enable the industry to continue to make its maximum contribution to the war effort.

We believe that a problem of primary consideration is that of materials in inventory, which at the present time are an unknown quantity and located in thousands of establishments scattered over the face of the entire nation.

As it now stands operators are allowed new materials to maintain and repair their existing systems, to furnish LP-Gas to existing customers, and to add new customers where the service is ruled by the WPB to be "necessary and appropriate in the public interest and to promote the war effort."

All of these cases require and will continue to require equipment of some kind, and as inventories in one area diminish, it will be necessary for some central authority to have on file a list of the materials available in other sections of the country. For practical purposes, at present, an inquiry to a salesman for a manufacturer is generally all that is needed to locate whatever is wanted. But this condition will not long continue, nor can the suppliers of either fuel or equipment be expected to maintain perpetual inventories of the stocks of their many hundreds of accounts.

We know from experience that eliciting information from the LP-Gas industry is a long and slow process. The Liquefied Petroleum Gas Association is now involved in an industry-wide survey that was undertaken last January, and returns are still being received. This survey was undertaken with the official backing of the Director of Marketing of the Office of Petroleum Coordinator, and yet by the time the returns are tabulated it is safe to say that they will be practically valueless for any except historical purposes.

The industry is already serving the nation at war to the fullest extent of its ability, but to increase the effectiveness of that service the WPB must be foresighted in its provisions not only to police, but to implement the technical resources in both men and materials now available.

1941 Domestic Sales Up 65% —Total Volume Gains 48%

AN UNUSUALLY active market for liquefied petroleum gases prevailing in 1939 and 1940 continued with increased momentum into 1941, when sales of 462,852,000 gals. were reported, a 48% gain over the 1940 total of 313,456,000, according to a survey made by the Bureau of Mines, Department of the Interior. It is believed that the 1941 volume of deliveries to consumers would have been even greater had equipment for handling and using liquefied petroleum gases been freely available and diversions for consumption as raw material in the manufacture of high-octane gasoline and other products been less of a factor.

Details of sales are shown in Tables 1 and 2.

All major demands for liquefied petroleum gases showed important gains in 1941 compared with 1940. Domestic requirements for cooking, water heating, and other household uses were 65% above the 1940 level, compared with a 53% expansion in 1940 over 1939. A 41% increase in deliveries of liquefied petroleum gases for industrial fuel in 1941 compared with a 12% increment in 1940 is largely the reflection of stepped-up defense activities. Gains in sales of liquefied petroleum gases to manufactured-gas companies and to chemical manufacturers of 25 and 28%, respectively, are slightly below comparative percentage increases shown for the same industries in 1940. An outstanding spurt (81% gain) made in the demand for liquefied petroleum gases for use as internal combustion engine fuel in 1940 was not repeated in 1941—probably partly due to the diversion of butane to other channels and to the

TABLE 1. SALES OF LIQUEFIED PETROLEUM GASES, 1935-41.

(Thousands of gallons)

Year	*Butane*	*Propane*	*Butane-propane mixtures*	*Pentane*	*Total*	*Percentage gain over previous year*
1935	34,084	26,814	13,492	2,465	76,855	36.2
1936	40,200	36,502	27,375	2,575	106,652	38.8
1937	45,399	46,474	46,694	2,833	141,400	32.6
1938	52,768	54,130	56,050	2,253	165,201	16.8
1939	71,351	79,323	69,020	3,886	223,580	35.3
1940	77,056	109,216	123,348	3,836	313,456	40.2
1941*	112,244	126,969	219,252	4,387	462,852	47.7

* Figures for 1941 subject to revision.
Prepared by A. T. Coumbe, Petroleum Economics Division.

TABLE 2. MARKETED PRODUCTION OF LP-GASES BY USES–1940-1941.
Total—All Gases

(Thousands of Gallons)

	1941			1940	
By Gas	*Total*	*% of Total*	*% Increase*	*Total*	*% of Total*
Domestic	221,130	47.8	65	134,018	42.7
Gas Manufacturing	25,356	5.5	25	20,285	6.5
Industrial	98,548	21.2	41	69,892	22.3
Chemical	44,379	9.6	28	34,671	11.1
Internal Combustion Engine	66,858	14.5	24	53,918	17.2
All Other Uses	6,581	1.4	88	672	.2
Total Sales	462,852	100.		313,456	100.

question of future supply—and the volume of sales for the purpose was only 24% above the 1940 total.

Butane deliveries made up about one-quarter (24%) of total sales of liquefied petroleum gases in 1941 or the same proportionate share as in 1940. The propane total declined from 35% of all deliveries to 27% in 1941, and a corresponding gain (39% in 1940 and 47% in 1941) is found in the relative quantity of butane-propane mixtures reported in 1941. The decline in the proportionate volume of propane in the 1941 sales of liquefied petroleum gases is logical when it is considered that deliveries of propane gained only 16% compared to a 78% increase in the market for butane-propane mixtures. As the bulk of propane requirements (77% in 1941) is reported for domestic use, where the unit of delivery is relatively small and where consequently new customers, although numerous, add relatively little to the annual demand and, while the larger share of butane-propane mixtures is credited to the manufacturing and chemical industries and to motor fuel demand, where requirements of individual consumers are proportionately large and fewer accounts can add materially to the total, it is believed that the percentage of butane-propane mixtures to the annual sales will probably expand and the relative propane total will decline.

The marketed production of butane increased from 77,056,000 gals. in 1940 to 112,244,000 in 1941 or by 46%, compared to a below-normal gain of 8% in 1940. A greatly increased demand for butane for domestic consumption (59% over 1940 requirements), industrial fuel (41% over 1940) and for internal combustion-engine fuel (67% higher than in 1940) were all important factors causing the sharp rise in butane sales in 1941.

The demand for propane increased by 16% from 109,216,000 gals. in 1940 to 126,969,000 in 1941. The unusual increase in the quantity of propane reported under "all other uses" for the Pacific Coast area (2,329,000 gals. in 1941 against no deliveries in 1940)

is said to be gas delivered to various Army camps for fuel purposes. It is known that a similar demand has developed in other areas, but the volume has evidently been reported under domestic use.

High Gains for Mixtures

An unusually high gain in sales of butane-propane mixtures in 1940 was repeated in 1941, when deliveries increased from 123,348,000 gals. in 1940 to 219,252,000 or by 78%. The quantity of butane-propane mixtures reported for domestice use more than doubled in 1941, increasing from 43,133,000 gals. in 1940 to 87,673,000 in 1941 and the latter amount was not far below the total for propane, the liquefied petroleum gas generally associated with the domestic trade. Butane-propane mixtures sold for industrial fuel increased ten-fold from 3,508,000 gals. in 1940 to 35,287,000 in 1941. It is evident that mixtures of butane and propane are replacing butane as industrial fuel, as greater quantities of the latter gas are now being diverted for raw material and blending agents in the making of various products. Chemical plants use important amounts of butane-propane mixtures in their processes and this demand increased from 30,636,000 gallons in 1940 to 39,243,000 in 1941, or by 28%. An unusually large volume of butane-propane mixtures was reported under "all other uses" in the Pacific Coast area and it is believed to cover deliveries to Army camps and defense housing projects as in the case of propane mentioned.

The following summary covering the distribution of liquefied petroleum gases by manufactured-gas companies in 1941 has been furnished through the American Gas Association:

"At the end of 1941, liquefied petroleum gas was being delivered through mains to consumers in 175 communities in 31 States by 90 companies supplying 65,300 customers.

"Butane-air gas with heating value ranging from 520 to 1300 B.t.u. per cu. ft. was supplied to 142 communities in 30 States by 73 companies. A mixture of undiluted butane and propane gas with a heating value of 2800 to 3000 B.t.u. per cu. ft. was supplied to 16 communities in Arizona, California, and Nevada by seven companies. Undiluted propane gas with a heating value of 2550 B.t.u. per cu. ft. was supplied to 19 communities in Maryland, Minnesota, New Jersey, North Dakota, Virginia, and Wisconsin by six companies."

Many additional companies—both petroleum refiners and natural gasoline plants—became interested in the liquefied petroleum gas market for the first time in 1941 due to the unprecedented demand for this type of fuel and have cooperated in this survey by showing the distribution of their sales. The number of suppliers reporting to the Bureau increased from 61 in 1940 to 92 in 1941; this included a rise in the Pacific Coast area from 19 in 1940 to 23 in 1941 and in all other areas from 42 to 69.

For West Coast statistics for 1941, see Page 42.

LP-Gas Industry Orders

ORDERS affecting the liquefied petroleum gas industry have been amended several times by the War Production Board.

So that members of the industry may have a quick reference to such ones as are now operative, the following summaries are given*:

EQUIPMENT

L-86. Limits installations. Allows re-installation of equipment in use prior to April 1, 1942, and withdrawn thereafter. Refilled containers may be substituted for empty ones on consumers' premises. Applies to utilities serving LP-Gas from town plants. Effective April 8, 1942.

P-100. Assigns A-10 rating to material for maintenance, repair and operating supplies of property of "producers" (suppliers). Does not apply to consumers. Effective Feb. 10.

PD-397. Form for exceptions under L-86.

APPLIANCES

L-79 (amended). Limits installations of appliances and enumerates classifications of those permitted, which include sales to occupants of new and old homes where there is no gas cooking, water heating and space heating equipment, and where no other equipment can be substituted; in homes started after July 1, 1941, but before April 10, 1942; and in homes where special authority has been granted in accordance with L-41. Effective May 23, 1942.

P-84. Assigns rating for material for emergency repairs to plumbing and heating equipment. Effective March 13, 1942.

L-23-c. Permits manufacture of special, light weight, domestic cooking and heating appliances by firms whose "factory sales value" for year ending June 30, 1941, did not exceed $2,000,000 and whose factory location is not in a "labor shortage area." Effective May 15, 1942.

L-41. Limits new construction. (L-79 permits installation of plumbing and heating equipment in buildings authorized by L-41.)

L-42 (Schedule IX). Limits manufacture of water heater tanks to three sizes—20, 30, and 40 gals. Effective April 25, 1942.

PRICE CEILINGS

Bulletin No. 1, OPA. Price ceilings set at sellers' maximum price sold or asked for any commodity during month of March, 1942. LP-Gas appliances are included, but gas fuel and gas equipment not listed. LP-Gas is covered in Amendment 14 of Price Schedule 88, dated Feb. 2, which fixes prices as of Oct. 2, 1941, for certain districts, and for remaining districts the maximum prices charged within the 60-day period prior to Oct. 15, 1941.

After July 1 service charges must not exceed those in effect at the March peak.

DELIVERIES

LP-Gas deliveries, repair and service calls are exempted from Orders 5 and 6 of the Office of Defense Trans-

* Those affected are urged to obtain and study official copies of all orders before making installations or applying for exceptions.—Editor.

portation. However, industry members suggest general compliance with the orders, which provide for only one delivery per day per customer and no special deliveries or call-backs except in emergencies.

LP-GAS

There are no restrictions on sales of liquefied petroleum gases to existing consumers. Expansion to new customers is limited in fact, however, by the restrictions on installations of equipment and appliances as covered in L-86 and L-79.

REFRIGERATORS

L-5-d. Under this order mechanical refrigerators in the stocks of dealers after June 15 are frozen except as to electric refrigerators in dealers' inventory Feb. 14. Sales may be made to certain Government enterprises, or on specific authorization of the Director of Industry Operations or sold back to the manufacturer. Issued May 26 and supercedes former L-5-b of Feb. 14, 1942. Applications to sell to Government should be on Form PD-427.

FURNACES

There is no existing order covering central heating plants (furnaces) except as they are limited by L-86 which prohibits gas connections to new customers. Present users of LP-Gas may be sold central furnaces, as also may Government housing projects.

OPEN CREDIT TERMS

Consumer credit rules have been constricted by an order of the board of governors of the Federal Reserve System as of May 6, and published in Regulation W. After that date open accounts must be paid by the tenth of the second month following date of purchase, which in no case could be longer than approximately 70 days, or from the first of one month to the tenth of the second month.

No charge accounts will be given further credit until paid in full or placed on an installment basis for payment within six months.

Installment sales can be extended over only 12 months instead of the former 15 months, and call for a down payment of one-third of the total purchase price. No installment payments shall be less than $5 per month.

LP-Gas appliances included are ranges, furnaces, space heaters and other heating units, water heaters, and air conditioning units.

EQUIPMENT AS COLLATERAL

In an interpretation of L-79 by the WPB on May 22, plumbing and heating equipment may be used as collateral in a security transaction and the title may pass when there is no physical movement of the equipment other than for the purpose of storage or warehousing without violating the order.

SUPPLIERS' INVENTORY

An amendment to Suppliers' Inventory Order L-63, effective May 23, provides that the maximum permissible inventory of suppliers may, at the option of the supplier, be calculated on the basis of two-thirds of the dollar value of sales shipped from inventories during the three preceding calender months, if the supplier is in the Eastern or Central war-time zones, and on the basis of a total dollar value equal to the dollar value of sales in a like period if the supplier is in any other time zone.

The movement of inventories from manufacturer to distributor or distributor to dealer is not affected; the order applies only to the installation of the equipment.

Latest News From Washington

IN the Government's effort to gain its important war ends, information and instructions to LP-Gas dealers continue to flow from Washington.

Industry members, serving so many civilians with fuel essential to the public health and welfare and the nation with vitally needed war supplies, will be interested in the latest news of current developments.

Equipment Installation Under P-84

Installation of equipment calling for more material than that being replaced is permissible under the Plumbing and Heating Repair and Maintenance Order (P-84) if the substitution is one of less critical material for that which is more critical.

This is made clear by Interpretation No. 1, issued June 1, which also declares that the prohibition against a substitution "more extensive than that which is necessary to replace" worn-out or damaged parts does not mean that the identical part or parts must be replaced.

Furthermore, installations calling for a different kind of equipment are not necessarily more extensive within the terms of the order, if the new parts do not contain a greater weight of metal.

•

Inventory Relief Promised

John F. Steele, Chief, Liquefied Petroleum Gas Section, Plumbing and Heating Branch, War Production Board, states that the WPB is endeavoring to arrange to relieve industry inventories of existing fabricated equipment. Method not yet decided. Such equipment is ear-marked for defense housing groups and all material in inventory will be utilized before critical materials are allocated or allowed for the construction of duplicate equipment and appliances.

The personnel of the LP-Gas Section is not yet complete, but Mr. Steele's principal assistants are F. H. Keppen and P. K. Thompson.

•

War Damage Insurance

How and where can businessmen obtain the Government's recently-created insurance protection against damage to private property from enemy attack?

The answer is, consult your own insurance agent or broker. He will accept applications for raid coverage.

The blanket protection which the RFC's War Damage Corp. formerly furnished without requiring a contract or the payment of premiums will expire June 30 and will be replaced by this new form of coverage.

Under the new plan, insurance companies will act as fiduciary agents for the War Damage Corp. in writing policies and collecting premiums. They will assume a percentage of all losses in excess of net premiums and have a corresponding interest in a small percentage of any profits.

Applications for such protection against enemy attack should be made before June 30 if possible, as coverage will not take effect until three days after application and check are filed.

This insurance covers physical loss of real or personal property, including automobiles, resulting from enemy attack or action of our own armed forces in resisting attack. However, it does not cover indirect

or consequential losses or those which occur due to blackouts, sabotage, seizure, capture, pillage or looting.

Rates are low and are uniform for the entire United States, they bring 10 cents per $100 on dwellings and furniture, and approximately 20 cents per $100 on manufacturing and industrial buildings.

•

Mechanical Refrigerators

Under date of May 26, and effective June 15, the WPB established rules for the disposition of approximately 600,000 domestic mechanical refrigerators now frozen in the hands of manufacturers and distributors. Production was discontinued April 30 and supplies now on hand must meet essential needs for the war's duration.

The new L-5-d, superceding the order L-5-b issued Feb. 14, does not prevent retailers from delivering gas and oil refrigerators which were fully paid for by ultimate consumers and were in the hands of the seller at the time of the original freeze order. These may still be installed after June 15, but other deliveries are limited to those for the army, navy, maritime commission or Panama Canal, which includes war housing projects and public health needs.

Government agencies expect to use 496,000 units during the remainder of 1942 and 1943 and the remaining 104,000 refrigerators will be held for possible use after 1943. Applications to sell to any of the above named government agencies should be made on Form PD-427.

•

Advertising Allowances

Advertising allowances granted by a seller for promotional services rendered by a buyer are not "frozen" by the general maximum price regulation and are not to be considered as an element in the price at which goods were delivered during March (the base period under the universal price ceiling), according to an official interpretation of May 28.

The seller is, therefore, not required to continue to grant the advertising allowances customarily granted by him to different purchasers or classes of purchasers.

If, however, allowances, even though designated as "advertising allowances," actually constituted a reduction in the price of merchandise and were granted by the seller without regard to promotional services to be rendered by the buyer (the distributor or retail outlet) the seller is required to treat such allowances in the same way as his customary allowances, discounts and price differentials prevailing in March.

Under the price regulation, a seller may not "change his customary allowances, discounts or other price differentials unless such change results in a lower price."

Advertising allowances constitute such practices as paying by a manufacturer, in whole or in part, the cost of a retailer's or distributor's promotional or display advertising, the cost of demonstrators or offering premiums to retailers and salesmen to push sales of new or slow moving commodities.

•

War Standards for Ranges

Prepared at the request of the War Production Board, "American Emergency Standard Approval Requirements for domestic gas ranges" were recently published and distributed to interested manufacturers. Formulated for the purpose of reducing amounts of strategic materials used in range construction to a minimum, these streamlined standards will remain in effect for duration of the emergency. They cover the so-called "cooker" type

range embodying separate oven and broiler, using a common burner, for both federal housing and civilian needs.

Major changes from the current range standards cover constructional features. All applicable standards for safety, performance, and efficiency remain unaltered. In view of the differences in material employed, certified models must bear the following permanently attached statement in addition to the A.G.A. Testing Laboratories Approval Seal: "Approval Seal: Approval under War Emergency Requirements."

•

Single Preference Rating Form

The use of preference ratings will be simplified and standardized by the terms of an amendment to Priorities Regulation No. 3, announced June 12 by the Director of Industry Operations.

Effective July 1, any preference rating, no matter how it has been assigned, may be applied or extended by a single form of certification, which states merely that the purchaser certified to the seller and to the War Production Board that he is entitled to use the preference ratings indicated on his purchase order, in accordance with the terms of Prorities Regulation No. 3.

In addition to the standard certification, orders on which a preference rating is applied or extended after July 1 must also include the identification symbols requiried by Priorities Regulation No. 10, which established the Allocation Classification system.

•

Electric Power Curtailment

Shortages of electric power in some areas and impending shortages in others, have caused the WPB to issue Limitation Order L-94 which provides for curtailment of electric power in the United States as needed.

Utilities must operate their systems so as to produce the maximum amount of power from present capacities, when and where shortages actually occur. Commercial and industrial consumers will be restricted first, and residential users last.

•

Styrene Order

Styrene, one of the basic raw materials from which synthetic rubber is made, was placed under complete allocation control June 1 by the Director of Industry Operations.

Producers are ordered to submit monthly delivery schedules to the War Production Board, by Order M-170.

Purpose of the order is to insure delivery of needed amounts of styrene to synthetic rubber plants without prohibiting the use of surplus styrene in the manufacture of plastics.

•

Air Conditioning, Refrigeration

The WPB banned all new "personal comfort" installations of air conditioning and commercial refrigeration equipment on May 15.

The order, L-38, also places restrictions on the production of the same equipment. As in other orders, the purpose is to provide essential equipment for vital governmental agencies. A-9 ratings, or better, are O. K.

•

War, Not Defense

The name of the "Office of Petroleum Coordinator for National Defense" has been changed to the "Office of Petroleum Coordinator for War," by virtue of an authorization of President Roosevelt.

The change was deemed "more appropriate to the situation existing today."

DIDJ'A KNOW

NATURAL GAS
WAS USED AS A WEAPON OF WAR - WHEN THE GERMANS ENTERED THE ROUMANIAN OIL FIELDS, PATRIOTIC DRILLERS RIGGED UP FLAME THROWERS WHICH PROVED INEFFECTIVE BECAUSE THEY WEREN'T MOBILE... ..... WORLD WAR II
IN 400 B.C. BAMBOO TUBES WERE USED TO PIPE NATURAL GAS INTO CANTON, CHINA!
WE TORE OUT THE PARTITIONS TO MAKE ONE ROOM
ONE ROOM HOUSES OF HUGE SIZE ARE POPULAR IN LIECHTENSTEIN (SWISS DIVISION) BECAUSE THE GAS COMPANY CHARGES BUT $1.98 PER ROOM PER MONTH!
SAFETY RECORD
THE WORLD'S SAFETY RECORD WAS RECENTLY MADE BY A MANUFACTURER OF GAS APPLIANCES, CLOW AND SONS, BIRMINGHAM, ALABAMA - 4 YEARS WITHOUT AN ACCIDENT!
$1.00 WILL BE PAID FOR UNUSUAL FACTS ABOUT NATURAL AND LPG GAS WHICH ARE ACCEPTABLE FOR THIS PAGE. SEND YOURS TO THE EDITOR.

E. Holley Poe Heads OPC Division

ANNOUNCEMENT has been made by Harold L. Ickes, Petroleum Coordinator for War, that the natu-

E. HOLLEY POE

J. W. MARTIN

ral gas and natural gasoline division of the Office of Petroleum Coordinator has been reorganized to function in the same manner and operate on the same level as the other OPC operating divisions. Its functions will now parallel the production, refining, transportation, and marketing divisions. The natural gas and natural gasoline section had formerly operated under the production division.

Director of the division is E. Holley Poe, who resigned as secretary of the natural gas division of the American Gas Association to accept the position. Others who will serve are Paul M. Raigorodsky, assistant director; J. Woodward Martin, Lone Star Gas Co., chief of LP-Gas section; R. W. Ducker; James E. Pew, and Thomas R. Weymouth.

The division will concern itself with all of the problems involved in the production of natural gas, the production and manufacture of natural gasoline, and the associated hydrocarbons used in the manufacture of aviation fuel, synthetic rubber and toluene, and the construction of natural gasoline extraction plants, according to Deputy Coordinator Ralph K. Davies.

◆ ◆

L.P.G.A. Elects Executive Board

THE new members of the executive board of the Liquefied Petroleum Gas Association, recently elected, are the following:

L. Abramson, Jr., Petrolane Gas Corporation; G. W. Bach, Skelly Oil Co.; M. L. Baker, Standard Oil Co. of Calif.; F. B. Boice, Shell Oil Co., Inc.; G. L. Brennan, Warren Petroleum Corp.; G. A. Burrell, Atlantic States Gas Co.; Ernest Fannin, Fannin's Gas & Equipment Co.; R. F. Foster, Lone Star Gas Co.; K. H. Koach, Green's Fuel, Inc.; Herman Merker, Pressed Steel Tank Co.; Walter H. Miller, Hamler Boiler & Tank Co.; Ellsworth L. Mills, The Bastian-Blessing Co.; W. A. Naumer, Carbide & Carbon Chemicals Corp.; E. Carl Sorby, Geo. D. Roper Corp.; H. Emerson Thomas, Phillips Petroleum Co., and W. F. Verkamp, Verkamp Corp.

The executive board elects the Association officers for the ensuing year from its own membership. This is usually done at the mid-Winter convention, which was cancelled this year on account of the war emergency.

THE BOTTLED GAS MANUAL

Chapter 12

Atmospheric Burners—Design, Applications

TONIGHT, as we enjoy the comfort and convenience of our gas appliances, I again think of those ancestors of ours who first adapted fire to their needs. I presume it required exhausting mental effort for them to follow through the thought that gas or vapor from crude fuel were actually burning to produce the desired heat. Ultimately, and down through the ages, this fact was recognized and led to the science of gas combustion.

In Chapter 9 we learned something about the adjustments of gas burners, and we also learned the names of some of the parts which go to make up a burner. We found out that the gas supply to the burner comes to it through an orifice, and that the orifice is a small drilled hole in a spud or hood and that this orifice discharges into the mixing chamber in the direction of the mixing tube and burner head. The size of the orifice depends upon the capacity of the burner head as well as on several other factors. What these are we shall learn as we go along in tonight's session.

If we want more heat we can increase the flow of gas to the burner by increasing the gas pressure, but this would also affect other appliances upon the system as well. Also, it would seriously affect the efficiency of the burner if it did not make it entirely inoperative. Propane burners of the Bunsen or atmospheric type are designel to operate on 11 in. of water column gas pressure. We must keep the gas pressure at this level as nearly as possible. Our only alternative then is to increase the size of the orifice—but, how much?

Theory of Flow Through Orifices as Against Practical Conditions. In theory the velocity of a gas flowing through an orifice in feet per second is equal to the square root of twice the product of the acceleration of gravity multiplied by the height of gas column in feet required to produce the pressure at the orifice under which the velocity is figured. Put in equation form:

$V = \sqrt{2GH}$ where

V=Velocity in ft. per sec.

G=Acceleration of gravity.

H=Pressure in ft. of gas.

Theoretically, the quantity of gas flow in cubic feet per second through the same orifice and under the same conditions is equal to the product of the velocity multi-

•

• The Bottled Gas Manual series by C. C. Turner, started in the July, 1941, issue of BUTANE-PROPANE *News* and will continue to be published monthly in chapter form until completed. This series constitutes a valuable text book and field manual that should be invaluable to everyone in the liquefied petroleum gas industry.—*Editor.*

plied by the area of the orifice in square feet, multiplied by a coefficient of flow—this coefficient being dependent upon several variables such as friction in passing through the orifice, angle of approach, and the length of the orifice channel. This in equation form is:

Q=VAC where

Q=Flow, cu.ft. per sec.

V=Velocity, ft. per sec.

A=Area of orifice, sq.ft.

C=a constant.

This is all very fine from a theoretical standpoint where the differential in pressure between both sides of the orifice is very small. The trouble in actual practice is that so many variables enter into the problem and so much figuring is involved that the theory can be used by us only in general guidance towards the establishment of more accurate equations particularly adaptable to the specialized requirements of our industry.

The variables which enter into any equation for the flow of a gas through an orifice are so small in measurable standards but so outstanding in their effect upon actual results that the only dependable way to determine the flow is an actual test of each individual orifice on the basis of the actual weight of liquid propane which will be vaporized and reduced to 11 in. of water column and in the gaseous state at this pressure pass through the orifice in one hour. The heat content of the propane used must be known in order to obtain actual results, and comparative tests must be reduced to the same temperature and atmospheric pressure.

Obviously, such a method of determining flows is an arduous task involving much figuring,and fortunately for the layman such extreme accuracy is rarely, if ever, required.

Orifice capacities for propane are given in the *Handbook, Butane-Propane Gases,** and are compiled using the equation:

$$q = aK\sqrt{\frac{h}{d}}$$ in which

q=the volume of gas in cu.ft. per hour.

h=the gas pressure in inches of water.

d=the specific gravity of the gas in relation to air.

K=an orifice constant or coefficient of discharge that depends mainly on the form of the orifice and the units employed.

a=the area of the orifice in sq.in.

The Difference Between Factory and Field-Drilled Orifices. It is said that "figures never lie, but liars often figure." How often have I thought of this when out in the field and confronted by the fact that the flow through an orifice exceeded what it should be according to charts and equations! This set me to thinking. I noticed that the variation from the charts was very slight when the orifice was drilled at the factory, but when I used an orifice which I drilled in the field there were substantial discrepancies, and these were always in the direction of excessive flow. It is an entirely different task to drill a small hole under factory conditions where the work is held in a jig and

*Published by Western Business Papers, Inc., 1709 W. 8th St., Los Angeles.

the drill feed automatic, as against conditions encountered in the field where the drill is held in a pin vise and the spud or hood placed upon a level spot—if you are fortunate enough to find such a place! Under field conditions the drill is bound to "wobble" and a certain amount of "reaming" is done in spite of your best efforts to avoid it. It occurred to me that over a period of time and through a large number of experiments there must be some factor which would be fairly accurate in determining the extent of human error and give results within workable limits. The converting of cubic feet into B.t.u.'s of orifice capacity also seemed an unnecessary step, so for three years I kept notes on the results of various field experiments in connection with the flow through orifices which were drilled upon the job.

The final composite picture gathered from these experiments has resulted in the following equations:

Q=3658 A cu.ft. per hour.

B=9,216,000 A B.t.u. per hour, in which:

Q=Cu.ft. flow of propane per hour.

B=Flow in B.t.u. per hour through orifice on basis of 2519 B.t.u. per cu.ft.

A=Area of orifice in sq. in.

The pressure in each test was 11 in. of water column.

Table 1 is a chart of orifice capacities that has been compiled upon this basis. My advice is to stick to the chart which you have been using unless you are confronted by making a conversion in the field, in which case you will find the chart given herewith possibly a little more accurate because of the human equation involved. Table 1-A will be helpful also.

Ports, and Their Relation to Orifice Capacities. The increasing of a burner's capacity is a whole lot more than simply increasing the amount of gas flowing to it. Ports have their limitations. We know that in order to obtain perfect combustion there must be a liberal supply of air—approximately 23.9 cu. ft. to each cu. ft. of propane gas burned. Some of this is entrained in the mixing chamber and is known as *primary* air. That which unites with the gas-air mixture at the port hole is known as *secondary* air.

It is obvious that the gas flowing to the burner through the orifice must be taken care of by the ports and that each port hole must take care of its proportionate part. Theoretically, a port of twice the diameter of a smaller port should handle four times the quantity handled by the smaller port, but it doesn't. Why? Here starts the "skin" theory.

We cannot consider the stream of gas coming from a port as being a solid mass. Let us think of it as being composed of several layers, or "skins." The outer layer is retarded in its passage through the port by friction with it, but the inner core rushes on. This means that the outer layer has an opportunity to mix with secondary air and the inner portion of the stream does not. Let us carry this "skin" idea a little farther and imagine it as having a very definite depth under the same conditions of pressure, re-

TABLE 1. PROPANE ORIFICE CAPACITIES

Based on experience with orifices drilled in field. Heating value taken as 2519 B.t.u. per cubic foot. Specific gravity 1.5206. Pressures at 11 inches *of water column.*

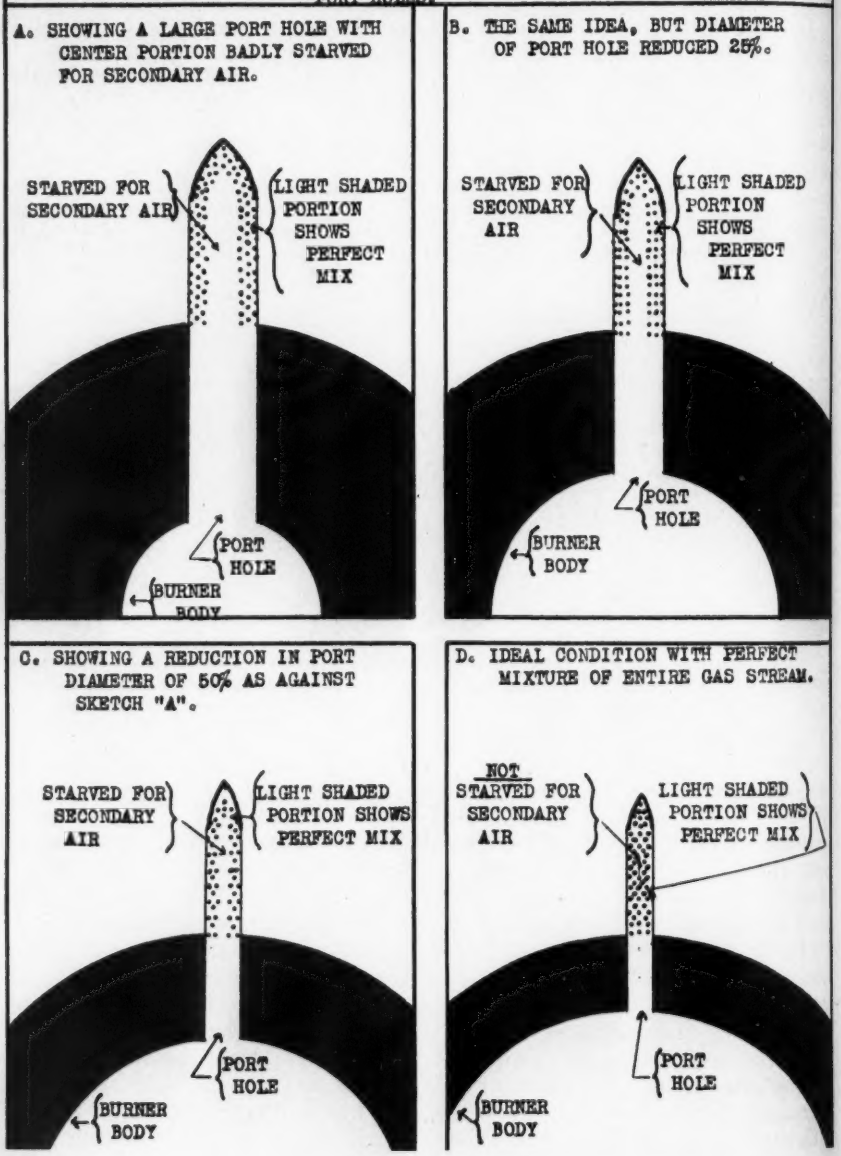
M.T.D. Drill Size	*Area in Sq. In.*	*B.t.u. per Hour*	*M.T.D. Drill Size*	*Area in Sq. In.*	*B.t.u. per Hour*
80	.000143	1317	48	.00454	41839
79	.000165	1520	47	.00484	44604
78	.000201	1852	46	.00515	47461
77	.000254	2340	45	.00528	48659
76	.000314	2893	44	.00580	53451
75	.000346	3188	43	.00622	57322
74	.000398	3667	42	.00687	63312
73	.000452	4165	41	.00724	66722
72	.000491	4524	40	.00754	69487
71	.000531	4893	39	.00778	71698
70	.000616	5627	38	.00809	74555
69	.000670	6174	37	.00849	78242
68	.000755	6957	36	.00891	82112
67	.00804	7409	35	.00950	87549
66	.000855	7879	34	.00968	89208
65	.000962	8865	33	.01003	92434
64	.001018	9381	32	.01057	97410
63	.001075	9906	31	.01131	104230
62	.001134	10450	30	.01296	119436
61	.001195	11102	29	.01453	129905
60	.001257	11584	28	.01549	142752
59	.001320	12164	27	.01629	150105
58	.001385	12763	26	.01697	156391
57	.001452	13381	25	.01755	161736
56	.001698	15648	24	.01815	167266
55	.00212	19537	23	.01863	171690
54	.00238	21933	22	.01936	178417
53	.00278	25619	21	.01986	183025
52	.00317	29214	20	.02036	187633
51	.00353	32531	18	.02256	207908
50	.00385	35480	16	.02461	226800
49	.00419	38614	14	.02602	239794

gardless of the diameter of the port hole through which it is flowing. If this is so, we have a condition such as is illustrated in Figs. 1 and 2. The larger the port, the less portion of the cross section area is taken up with "skin." If, however, we decrease the diameter of our ports the proportion of the cross section area taken up by "skin" is increased until we arrive at a condition such as shown in Figs. 1D and 2D wherein the entire cross section area is composed of "skin." This is the ideal condition.

The problem of mixing with secondary air is not then one of cross section area of the port hole but of circumferential length. It will be found that in the run of domestic appliances ideal combustion can usually be obtained with an input of 1 B.t.u. for every .003 in. of circumferential port length and that

FIG. 1

ILLUSTRATING THE THEORY OF MIXING WITH SECONDARY AIR- SMALL VS. LARGE PORT HOLES.


A. SHOWING A LARGE PORT HOLE WITH CENTER PORTION BADLY STARVED FOR SECONDARY AIR.
STARVED FOR SECONDARY AIR
LIGHT SHADED PORTION SHOWS PERFECT MIX
PORT HOLE
BURNER BODY
B. THE SAME IDEA, BUT DIAMETER OF PORT HOLE REDUCED 25%.
STARVED FOR SECONDARY AIR
LIGHT SHADED PORTION SHOWS PERFECT MIX
PORT HOLE
BURNER BODY
C. SHOWING A REDUCTION IN PORT DIAMETER OF 50% AS AGAINST SKETCH "A".
STARVED FOR SECONDARY AIR
LIGHT SHADED PORTION SHOWS PERFECT MIX
PORT HOLE
BURNER BODY
D. IDEAL CONDITION WITH PERFECT MIXTURE OF ENTIRE GAS STREAM.
NOT STARVED FOR SECONDARY AIR
LIGHT SHADED PORTION SHOWS PERFECT MIX
PORT HOLE
BURNER BODY

satisfactory results can be obtained with an input of 1 B.t.u. for every .00214 in. By careful study of Table 2 it will be noted that results figured upon this basis very nearly coincide with the recommendations of the Phillips Petroleum Co. in their service manual, and that the only substantial variation comes in ports of No. 30 size and larger. Such ports are never used in domestic appliances, nor should they be on account of the danger of their firing back onto the spud. A very few commercial water and space heaters do use burners with ports of these larger sizes, but the practice is not to be recommended, and greater economy can be obtained by using more ports of smaller diameters and then locating the burner properly in relation to the surface which is to be heated.

A graph of port capacities will be found in Fig. 3.

Spacing of Port Holes. The spacing of port holes is extremely important. If the holes are too far apart difficulty will be experienced in having the flame carry over from one hole to the next one. If they are too close together a proper amount of secondary air cannot get between them and the advantage of the circumferential length between the ports is lost. Table 3, based on experience, has served me well for several years.

Depth of Port Holes. The depth of the port hole has much to do with preventing back-firing onto the orifice. One group of engineers advocates port holes that are three times their diameter in depth. Others say that they should be from 3/16-in. to 3/8-in. deep, preferably the latter. This latter method of determining port depths has never seemed quite definite enough to me, and I have used Table 4 with excellent results. The column of "Decimal Depths" is exactly three times the port diameter. The "Fractional Inch" column is *not* equivalent to "Decimal Depths", but is the *next larger* measurement in fractional inches that is in common use.

Table 1-A. Pilot Sizes of Orifices Not Listed in M.T.D. Drill Sizes

Diameter Inches	*Area in Square Inches*	*B.t.u. per Hour*
.004	.0000125	115
.005	.0000196	180
.006	.0000282	259
.008	.0000502	462
.010	.0000785	723
.012	.0000113	1041

NOTE: To convert any of the above capacities in B.t.u. per hour to Cu. Ft. per hour, divide the B.t.u. per hour by 2519.

Recommended Depths Not Always Obtainable. Oftentimes the novice will criticise a factory for not making burners strictly in accordance with the rules of construction which he has learned. Two important facts should be kept in mind before making a criticism of this nature. In the first place, there is no hard-and-fast rule for the construction of burners which says that "this way, and this way only is right." By way of example, I was recently called in by a manufacturer to remedy a backfiring condition upon his oven burners. Those burners conformed to every rule which has been propounded here, and still they backfired. It was found that the trouble did not

TABLE 2. RECOMMENDED BURNER INPUTS PER PORT HOLE

Figured on Basis of 1 B.t.u. for Each .003 In. of Port Circumference for Ideal Conditions and .00214 In. Max.

Figures per Phillips Petroleum Co. Service Manual of 6-15-32 KRL:AM V-A-4

MTD Size Port Hole	*Diameter Inches*	*Area Square Inches*	*Circumference Inches*	*Ideal Input*	*Maximum Input*	*Optimum or Preferred*		*Maximum or Most Allowable*	
						B.t.u. Hour Per Port	*B.t.u. Sq. In. Port Area*	*B.t.u. Hour Per Port*	*B.t.u. Sq. In. Port Area*
54	.0550	.000238	.172788	57.5	80.5	51	21.400	...	...
52	.0635	.00317	.1994916	66.4	92.96	63	19.900	...	...
50	.0700	.00385	.219912	73.3	102.62	71.6	18.600	...	...
48	.0760	.00454	.238716	79.5	111.3	78.5	17.300	111	24.400
46	.0810	.00515	.2544696	84.8	118.72	83.5	16.200	119.5	23.200
44	.0860	.00580	.2701776	90.0	126.0	87.5	15.100	128	22.100
42	.0935	.00687	.2937396	97.7	136.78	92.7	13.500	138	20,100
40	.0980	.00754	.3078768	102.5	143.50	97	12.870	143	19.000
38	.1015	.00809	.3188724	106.2	148.68	101	12.500	148	18.300
36	.1065	.00891	.3345804	111.5	156.10	109	12.200	155.5	17.450
34	.1110	.00968	.3487176	116.2	162.68	116	12.000	163.7	16.900
32	.1160	.01057	.3644256	121.4	169.96	126	11.900	175	16.530
Water Heaters and Industrial Burners									
30	.1285	.01296	.4036956	134.5	188.3	150	11.600	208.5	16.100
Industrial Burners Only									
28	.1405	.01549	.4413948	147.1	205.94	176.5	11.400	244	15.750
26	.1470	.01697	.4618152	153.9	215.46	190	11.200	264	15.550

FIG. 2

ILLUSTRATING THE "SKIN" THEORY OF SECONDARY AIR MIXTURE AT THE PORT HOLE.

A. LARGE PORT. THE "SKIN" SECTION IS A RELATIVELY SMALL PART OF THE GAS STREAM.

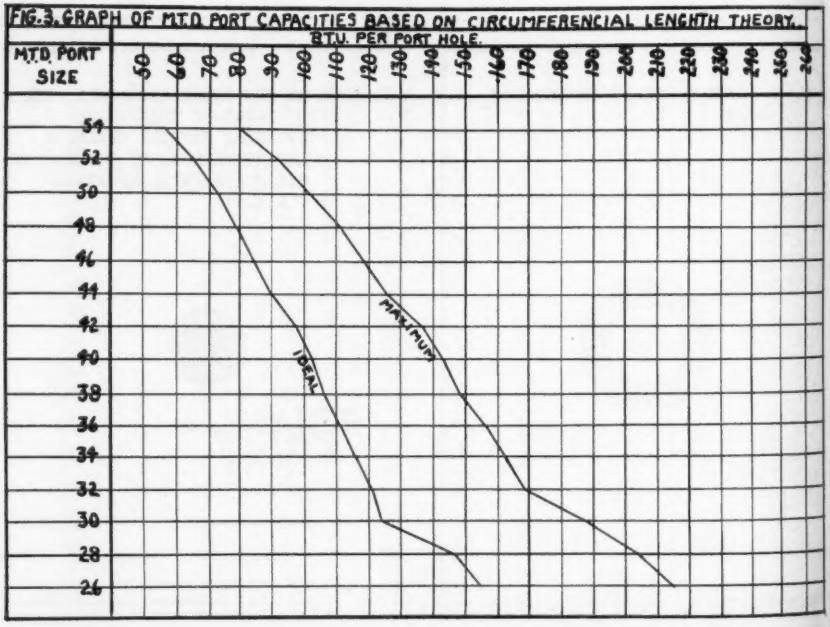
B. A SMALLER PORT. THE "SKIN" SECTION IS A LARGER PROPORTION OF THE GAS STREAM.

C. A FURTHER REDUCTION IN PORT SIZE.

D. HERE IS THE IDEAL CONDITION. THE "SKIN" TAKES UP THE ENTIRE PORT AREA, THEREBY GIVING A PERFECT MIXTURE OF THE ENTIRE GAS STREAM WITH SECONDARY AIR.

lie in the burner but *in the conditions under which the manufacturer was asking it to operate.* Cutting down the ports one size and changing the shape of the hood made possible an even greater input than the burner could handle before, and absolutely eliminated the backfiring. The second fact which must be kept in mind is that many things which are fine from a theoretical standpoint are either difficult or impractical from a production standpoint. On another oven job which I was called in upon, the depth of the oven port holes was definitely too little. We tried thickening the casting on the port hole side and found that this caused the burner to warp in cooling. Before we got done with that job we had to place webbings upon the opposite side of the burner in order to counteract this warping, and this change required alterations in the patterns of five other pieces with just as many resulting headaches and a lot of expense. Both of the manufacturers mentioned have learned from bitter experience that the building of an oven is a whole lot more than constructing an iron box and placing a burner under it, and their future models will be engineered as a whole with plenty of thought given to a proper balancing of the oven and the burner.

Raised Ports Are an Advantage. Raised ports, providing their overall diameter is not too great in relation to the diameter of the port hole itself, are of great advantage in that they allow mixing of secondary air with the gas-air mixture



at a point nearer to the burner port hole. This results in a better flame, a better mixture, more perfect combustion, and greater economy in operation.

Distance of Port Holes from Surface to Be Heated. The transfer of heat from a burner to the material to be heated is by convection, conduction, or radiation. In the case of convection, the transfer is by the circulation of hot gases, and the distance from the surfaces to be heated does not matter as much as the volume of the space to be heated in order to accomplish this transfer and the velocity and quantity of fresh air through this space. The space to be heated should be kept as small as possible and at the same time allow ample opportunity for heat transfer without excessive stack temperature losses. The flow of gases out of the stack should be checked as much as possible and at the same time allow sufficient incoming secondary air for proper combustion. There is, at the present time, no practical rule for this balancing of these two matters of design, and the party responsible for the design of such appliances or their conversion from other fuels must be guided by good common sense plus the recordings of thermometers or thermocouple units in relation to the results obtained and the efficiencies achieved.

TABLE 3. RECOMMENDED SPACING OF PORT HOLES ON CENTERS

MTD Port Size	*Spacing on Centers*	*MTD Port Size*	*Spacing on Centers*
54	3/16″	38	5/16″
52	3/16″	36	5/16″
50	3/16″	34	3/8″
48	1/4″	32	3/8″
46	1/4″	30	3/8″
44	1/4″	28	3/8″
42	5/16″	26	3/8″
40	5/16″		

In the placing of port holes for the transfer of heat by radiation we should again review what we had to say in Chapter 3 in reference to the laws of radiation. The transfer of heat from a propane burner by radiation is of a secondary nature in that the propane flame heats a radiating medium and that in turn reflects the radiant energy in the direction that it is desired. Port holes should be located

TABLE 4. RECOMMENDED PORT DEPTHS

MTD Port Size	*Decimal Depth*	*Next Fractional Inch Depth*	*MTD Port Size*	*Decimal Depth*	*Next Fractional Inch Depth*
54	.165	11/64	38	.3045	5/16
52	.1905	13/64	36	.3195	21/64
50	.210	7/32	34	.333	11/32
48	.228	15/64	32	.348	23/64
46	.243	1/4	30	.3855	25/64
44	.258	17/64	28	.4215	7/16
42	.2805	9/32	26	.441	29/64
40	.294	19/64			

as close to the radiating medium as possible in line with good combustion, and the radiating medium should be located as closely as possible to the surface to be heated if we wish to obtain the greatest efficiency. Remember that second law of radiation—"The amount of radiant energy transfitted to a body varies inversely as the square of the distance from the energy source."

Where the transfer of heat is dependent upon conduction and the medium through which conduction is to be effected is supposed to be in actual contact with the propane flame, there are very definite limitations in the distance that the port hole should be away from the conducting medium. In the atmospheric or Bunsen burner operating under 11 in. of water column pressure the distance from the top of the port to the conducting medium should be from 5/8-in. to 7/8-in. and the location within these limitations is dependent upon the characteristics of flame produced by the burner. Better read again what we had to say in Chapter 9 about propane flame characteristics and study the flame sketches given there! If you are guided by this and use good judgment you cannot go far astray.

The Arrangement of Port Holes. Many an otherwise good burner has been completely ruined by improper arrangement of the port holes. The ideal condition is an arrangement of ports by which secondary air may get to the flame from all sides. Fig. 4 shows several arrangements of ports in a simple bar burner, and graphically shows us why staggered or three rows of ports are *bad.*

Burner Installation. In Fig. 5 I have tried to illustrate the right and the wrong way of installing a burner beneath any appliance which has a skirt on the combustion chamber. This is a condition which is often encountered in the conversion of coffee urns and steam tables. If the burner is located as in "A" the burned gases back up, thereby interfering with a proper supply of secondary air to the port holes. The draft condition produced also prevents sections of the bottom from receiving any heat.

The proper way to install a burner under such conditions is to drill a lot of holes in the skirt flush with the bottom of the surface to be heated. Three-eighths holes on 1-in. centers will usually provide proper venting and permit the burner to be placed within from 5/8-in. to 7/8-in. from the surface to be heated.

The larger clearances between the burner and the bottom sheet of steam tables may be made to allow for a slight sagging of the sheet with continued usage. Sometimes, horizontal or inclined flame gas burners are preferred for conversion of steam tables or coffee urns.

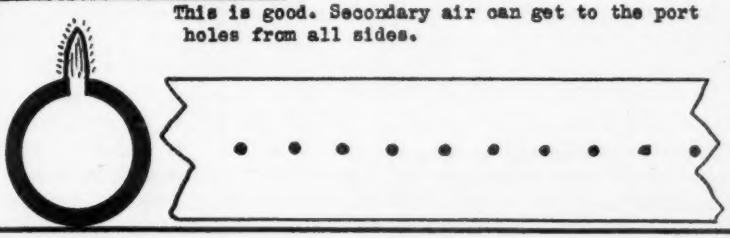
Burners which are especially designed for coffee urn, plate warmer, steam tables or other restaurant service are on the market and may be purchased by bottled gas dealers for such installations. It is important to specify the heating value, specific gravity and pressure of propane gas when ordering such equipment. In this way only a minor adjustment of the orifice may be nec-

FIG. 4

SHOWING VARIOUS PORT HOLE ARRANGEMENTS IN SIMPLE BAR BURNERS.

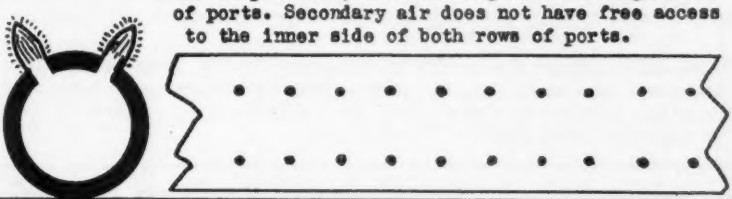
A. WITH A SINGLE ROW OF PORTS.

This is good. Secondary air can get to the port holes from all sides.



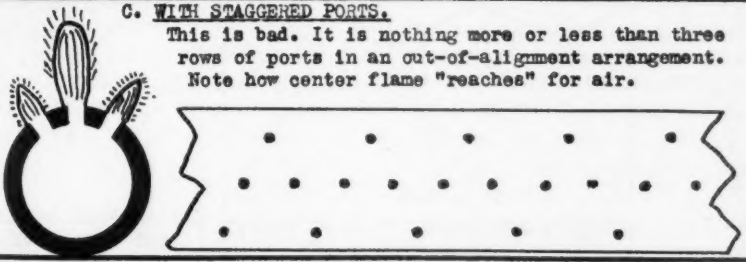
B. WITH TWO ROWS OF PORTS.

This is passable, but not as good as a single row of ports. Secondary air does not have free access to the inner side of both rows of ports.



C. WITH STAGGERED PORTS.

This is bad. It is nothing more or less than three rows of ports in an out-of-alignment arrangement. Note how center flame "reaches" for air.



D. THREE ROWS OF PORTS.

This is very bad unless burner is turned upside down as in a broiler. Note how the center flame is "reaching" for air.

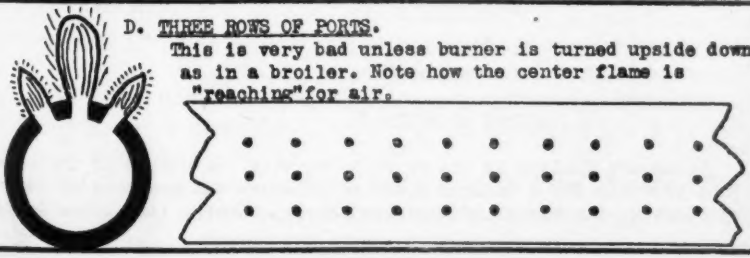
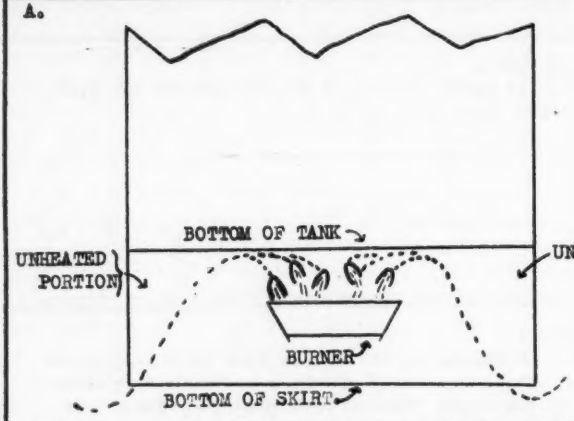


FIG. 5

SHOWING THE RIGHT AND THE WRONG WAY TO INSTALL A BURNER UNDER ANY APPLIANCE HAVING A SKIRT AROUND THE COMBUSTION CHAMBER.

A.

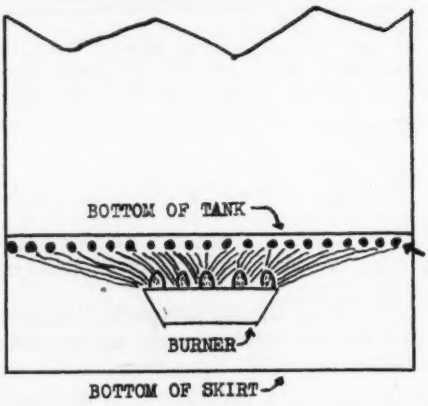
THE WRONG WAY.



The skirt causes the products of combustion to "back-up" so that secondary air cannot get to ports. This causes improper combustion and possibly a floating flame. Note the unheated portions due to "dead air" or improper provision for circulation.

B.

THE RIGHT WAY.



Holes are drilled in the skirt flush with the bottom of the tank. This provides for a natural draft which draws the products of combustion up close to the bottom of the tank thereby heating its entire surface.

essary on the job. Orifice adapters are also available which may be obtained in accurate factory-drilled orifice sizes, together with convenient tools for installing them in orifice caps or hoods. Gas valves, tubing, and burner valves will also be required for a satisfactory installation. If automatic temperature control is desired, a thermostat and safety pilot would be installed.

Thermostats. Temperature control of coffee urns is a very important factor in obtaining a good quality of coffee and has the additional advantage of effecting a saving in gas consumed over operation under manual control. The improved quality of coffee brewed under thermostatic control, together with the added convenience and improved service obtained has been demonstrated over and over again in actual restaurant service.

Similarly, steam tables which are automatically controlled by thermostats reduce the possibilities of food being over-cooked by high temperature steam (212° F.). In fact, good practice calls for the maintenance of water in the steam table at 180° F., or lower, to check the tendency for cooking to continue after the food is already prepared. Incidentally, there is a saving in gas and in the amount of heat thrown off from the steam table by using such thermostatic control.

Occasionally such appliances have a concaved bottom such as is shown in Fig. 6. It is a temptation to place the burner up into the concave portion, but *don't* do it. The burned gases will back up and make the flames lift from the ports in their thirst for air, and it is also quite possible that in addition to getting inefficient combustion and objectionable combustion odors the flame may be smothered and go out. Put the burner slightly below the edge of the skirt and rely upon convection to do the heating. This is not as efficient as the method shown in Fig. 5-B, but it may be the only solution to your problem.

Relationship of the Ports to the Mixing Chamber. We cannot drill port holes to our heart's content in a burner, for the gas coming to those port holes must come through the mixing chamber, and there is a limit to the amount of gas-air mixture which can flow through it under the inspiration of a gas pressure of 11 in. of water column. It has been determined that the total port area should be not more than 2.222 times the cross section of the mixing tube at its smallest point. Putting it in other words and considering it from the standpoint of the mixing tube, its cross section area at its smallest point must be about 45% of the total area of the port holes.

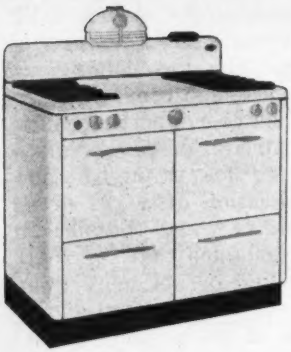
The Mixing Tube. Let us go back to Chapter 9, Fig. 1, and see just what the mixing tube is. It is that portion of the burner which lies between the mixing chamber and the burner head. In the case of a simple bar burner it is that portion of the burner which lies between the mixing chamber and the first port hole.

The mixing tube should be in length at least six times its own internal diameter at its smallest

Grand

GAS RANGES

SAFETY OVEN PILOT. *Can't be blown out by drafts or by opening and closing of drawer or oven door. 100% cast iron. Placed to assure years of efficient service.*

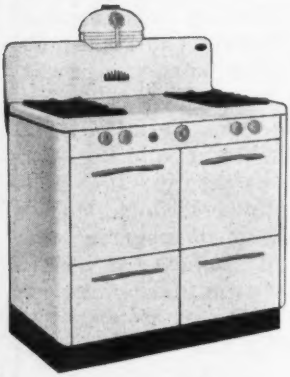


MODEL RB-84X

Divided cooking top, full 40" wide. Two rear simmer burners, a Giant burner. Oven 18" wide, 19" deep. Oven light. Large compartment and storage drawer, Ebonite finished. Pull-out drop door broiler

MODEL RB-65X

Divided top, 37" wide. "Peek-a-boo" oven, 19" x 16". Sunshine oven light. Pull-out broiler, two storage drawers. Simmer valves on rear burners. Acid resistant porcelain top.



MODEL RB-6X

Divided 37" top with 2 rear simmer burners. Oven 19" x 16". Two safety-lock oven racks. Two-piece broiler pan, two large storage drawers. Non-glare lamp with built-in timer.

MODEL RB-3X

Conventional top, 37" wide. Pull-out broiler with one-piece broiler pan. Oven 19" x 16", two large storage drawers. Quick positive top burner lighter, two simmer burners.

There's a Grand for every purse, every purpose

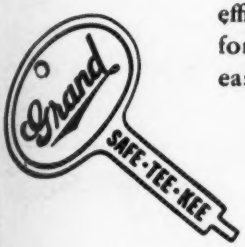
GRAND RANGES • CLEVELAND, OHIO

Division of The Cleveland Cooperative Stove Co.

specially designed for superior performance with

L. P. GAS

Every Grand feature is a selling feature for you . . . because Grand Ranges are specially engineered for top efficiency with L. P. Gas. The Grand line, with its models for every family's purse and cooking needs, makes it easy to convert customers to modern L. P. Gas cooking.



SAFE-TEE-KEE EQUIPPED
An extra safety and economy precaution, exclusive with Grand. This handy removable key locks off the gas supply, safe from prying hands of children, when range is not in use. Gas can't escape or burn needlessly.

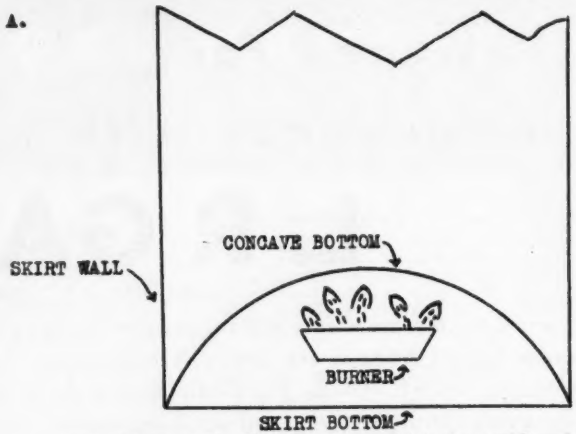
THE GRAND CHAMPION
. . . a luxurious, large-capacity model with six burners and griddle, includes four simmer burners. Roomy Champion oven and radiant Charco-lator Broiler. *Two* large storage drawers. Smart non-glare lamp with built-in timer. Many other features give proven sales appeal.

LEAKAGE PREVENTED
Every joint and valve is specially sealed and tested for the particular type of L. P. Gas to be used.

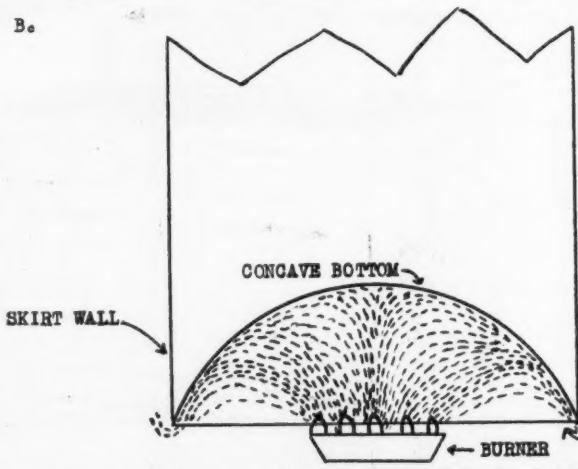
GRAND CHAMPION RB-10X

FIG. 6

SHOWING THE RIGHT AND WRONG WAY OF INSTALLING A BURNER BENEATH A CONCAVE SURFACE WHEN THERE IS NO OPPORTUNITY FOR PROPER VENTING.



The flame will float and possibly be extinguished by burned gases.



The burner is installed slightly below the bottom edge of the skirt.

point. It is here that the mixing of the gas with the air inspirated in the mixing chamber is completed, and a reasonable length is necessary in order to complete this process properly. There are instances of burners with somewhat shorter mixing tubes performing satisfactorily, but they are the exception rather than the rule, and it is quite likely that they would operate with greater efficiency if ample length of the mixing chamber had been allowed.

We have tonight laid the foundation in our accumulated knowledge for the designing and converting of gas burners for propane usage. Let's thoroughly learn these fundamentals before we go on to our next chapter, which will take us farther along this interesting road of building and changing burners to suit our particular needs. Answering the following questions will serve as a review of this chapter. The answers are on Page 56.

•

Questions on Chapter 12

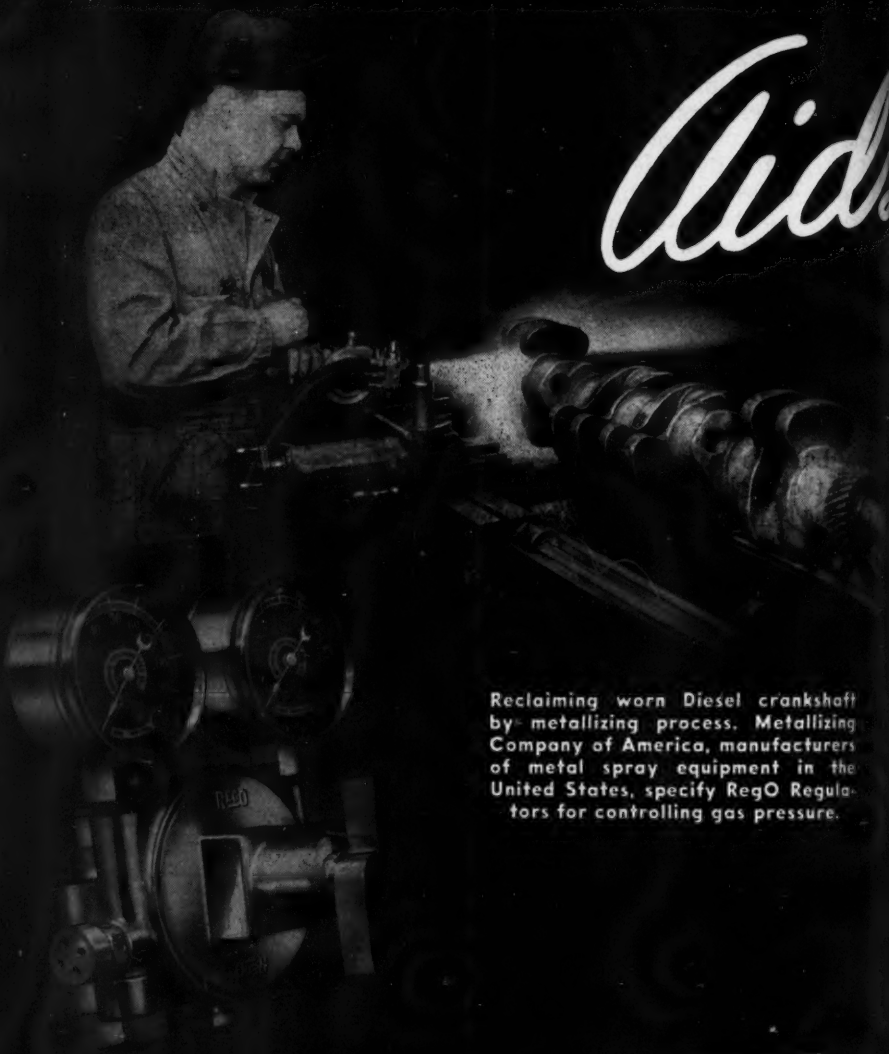
1. An off-size drill has a diameter of .0405 in. Using the equation B=9,216,000 A, how many B.t.u.'s per hour would an orifice of this diameter pass?
2. The equation B=9,216,000 A is based upon 2519B.t.u.'s per cu. ft. of propane gas. If your supplier furnished you with a gas of 2600 B.t.u. per cu. ft. what would this same orifice of .0405-in. diameter pass in B.t.u. per hour?
3. In the "skin theory" of orifice capacities what is the ideal circumferential length of port holes per B.t.u. per hour?
4. In this same theory what is the maximum desirable circumferential length of port holes per B.t.u. per hour?
5. A certain burner has 16 in. of circumferential port length. It is desired to supply it with propane at a B.t.u. per hour rate half way between the ideal and maximum recommended capacities. How many B.t.u.'s per hour would this be for the entire burner?
6. If a burner has 21 in. available for the drilling of port holes and you are going to drill No. 32 ports, how many port holes should you put in this space?
7. What should be the distance between the top of the port hole of a range top burner and the bottom of a cooking vessel over it?
8. Why is provision made in the construction of the top of a range so that cooking vessels will not rest flush upon it?
9. What should be the smallest diameter and length of a mixing tube in a burner having 200 No. 32 ports?
10. If a No. 58 MTD hole were to be used for a port, and its diameter is .0420 in., what should its minimum depth be?

•

(Chapter 13 of THE BOTTLED GAS MANUAL will appear in the August issue, of BUTANE-PROPANE *News.)*

ANOTHER OF THE LP GAS INDUSTRY'S

Aid



Reclaiming worn Diesel crankshaft by metallizing process. Metallizing Company of America, manufacturers of metal spray equipment in the United States, specify RegO Regulators for controlling gas pressure.

REGO

LP GAS EQUIPMENT

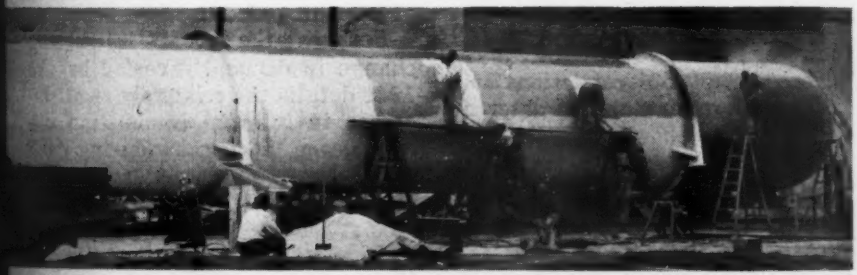
BUY WAR BONDS
FOR VICTORY

to Victory ★ ★

METALLIZING PREFERS PROPANE FOR POWER

An important factor in the Government's Metal Conservation Program is metallizing, or metal spraying. Rego regulators by Bastian-Blessing are preferred in this process because of their accuracy, dependability, ruggedness and proven economy.

Metallizing is a reclaiming process where wire is converted with the highly volatile propane into a metal spray which is used to build up worn machinery parts to necessary size and to make exposed equipment corrosion resistant. This process may bring economies to you as it does to many industries.



Spraying zinc on a gas tank in California to prevent corrosion. A similar tank metallized 10 years before in the same area showed no corrosion, and had economically saved costly bi-annual repaintings.

Insure perfect performance and economy by insisting on genuine Bastian-Blessing products identified by the RegO trademark.

The **BASTIAN-BLESSING** Co.

4233 Peterson Avenue Chicago, Ill.

REGO LP GAS EQUIPMENT UL

Pioneers in equipment for using and controlling high pressure gases.

Army Camp LP-Gas Needs Boost 1941 California Sales

WAR conditions appear to have had no adverse effect upon liquefied gas sales by California marketers in 1941, according to Edward T. Knudsen, supervising economic analyst of the U. S. Bureau of Mines, Los Angeles. In fact, sales to the Federal Government contributed materially to the establishment of a new high sales record of 102,885,000 gals. (excluding exports). The effect of transportation difficulties and equipment restrictions upon current sales is not apparent because the monthly statistics relating to liquefied petroleum gas demand include certain company uses, but total demand during the first three months of 1942 appears to have increased more than 50% over the first three months of the record year 1941. Doubtless, the adverse effect of restrictions will become more pronounced later in the year but above data, the only available at this time, indicate that the high level of industrial activity and direct sales to the Government have more than offset possible losses elsewhere.

The increase in sales in 1941 over 1940 (see Table 1) amounted to approximately 42%, compared with the 50% increase in 1940 over 1939, but the volume gain in 1941 was considerably higher than in 1940, 30,288,000 gals. compared with 24,100,000 gals. The largest percentage gain, 54%, occurred in propane, which is logical because of the diversion of butane to oil refinery usage. Nevertheless, butane sales increased 42% and sales of propane-butane mixtures increased 39%.

The increase of 30,288,000 gals. in total sales comprised the following increases in the various items of demand:

Uses	Gallons
Domestic	12,578,000
Gas manufacturing	2,275,000
Industrial fuel	5,645,000
Internal combustion engine fuel	3,282,000
All other uses	6,508,000
Increase in total sales (excluding exports)	30,288,000

It will be noticed that no item of demand failed to increase.

Perhaps the most interesting change in demand revealed by the 1941 data is the relatively small increase in internal combustion engine usage. Such sales during each of the last four years were: 1938—16,768,000 gals.; 1939—24,048,000 gals.; 1940—39,135,000 gals. and 1941—42,417,000 gals. Softening of the gasoline market and some question as to the continued availability of butane may have retarded the expansion of internal combustion engine demand, partly nullifying the effect of increased business activity.

At least nine Army camps in the Pacific Coast territory are using liquefied petroleum gases for cook-

TABLE 1. LIQUEFIED PETROLEUM GAS SALES BY CALIFORNIA MARKETERS—1941 AND 1940

(Thousands of Gallons)

Uses	Propane		Propane-Butane		Butane		Total	
	1941	1940	1941	1940	1941	1940	1941	1940
Domestic	10,432	8,293	17,899	9,570	6,666	4,556	34,997	22,419
Gas manufacturing	25		3,509	2,774	7,039	5,524	10,573	8,298
Industrial fuel	1,220	510	3,903	1,560	2,778	186	7,901	2,256
Solvents and chemical manufacturing	..	..	32,713	30,930	9,704	7,920	42,417	39,135
Internal-combustion engine fuel	..	285	4,227	..	441	489	6,997	489
All other uses	2,329	..	62,251	44,834	26,628	18,675	102,885	72,597
Total	14,006	9,088						
Segregation of abcve total by method of transportation.								
Bulk shipments	4,988	1,011	59,602	43,996	26,324	18,640	90,914	63,647
Cylinder and drums	9,018	8,077	2,649	838	304	35	11,971	8,950

ing and heating. Some of these camps can accommodate as many as 30,000 men and consume appreciable quantities of fuel, as indicated by the large increase in sales reported as "All other uses," in which Government sales are included. This item "All other uses" increased from 489,000 gals. in 1940 to 6,997,000 gals. in 1941.

Domestic Use Increased 41%

The increase in "Domestic" usage amounted to 12,578,000 gals., about 41% of the increase in total sales, but was not so spectacular as the increases in 'All other uses" and "Industrial fuel." These classes of demand rose to 14 and 3½ times their respective 1940 levels. Gas manufacturing demand increased from 8,298,000 gals. to 10,573,000 gals. California no longer has the large excess natural gas supply of prior years and if nothing intervenes, liquefied petroleum gases frequently will be used in lieu of natural gas.

The data contained in this report do not include (because they are not sold as such) liquefied gases used directly by the producers for fuel, polymerization, solvents, dewaxing, blending with gasoline or as a raw material in chemical plants which are operated by liquefied gas producers. A very large amount of liquefied gases is used in California for these purposes.

•

U. S. Bureau of Mines statistics for 1941 for the entire nation will be found in this issue, beginning on Page 12. California figures are included.—Editor.

Two Rubber Plants To Cost 43 Million

HUMBLE Oil & Refining Co. closed contracts the first part of June for the construction of a butyl-rubber plant for the Government at an estimated cost of approximately $16,000,000, according to the June 2 issue of *The Oil and Gas Journal.* Upon completion this plant will be leased by the Humble company and will be operated by it under a contract with Rubber Reserve Co., a subsidiary of Reconstruction Finance Corp.

This arrangement covers the second plant to be operated by Humble for the Government in connection with the production of synthetic rubber. The first plant, which likewise involved investment by the Government of approximately $16,000,000, is for the production of butadiene, which is an ingredient of synthetic rubber of the buna type. The total investment to be made both by Humble and the Government in these projects will aggregate approximately $43,000,000. A portion of the investment will be made by Humble in the refinery for the production of the raw materials to be supplied by the company in connection with the manufacture of butyl rubber and butadiene.

Butyl is one of the newer types of synthetic rubber. The process for its manufacture from petroleum was developed by Standard Oil Development Co., and has been made available to prospective manufacturers on a royalty-free license basis for duration of the war. Butyl rubber is unusually resistant to heating and aging, and is therefore particularly useful for insulation of electric wires, impregnation of balloon cloth, and in many other products essential in the war program. While it appears to be satisfactory for the production of inner tubes for tires, it has not yet proved entirely satisfactory for the manufacture of automobile casings.

Research work now in progress may develop butyl rubber into a product satisfactory for use in automobile casings. For the present, however, its greatest usefulness in the war program is in the manufacture of rubber specialty products and in releasing natural rubber and buna rubber for use in automobile tires.

◆ ◆

Daniel Vela, Mexico Operator, Flies Butane Plane to Texas

Daniel Vela, owner and manager of Cia Distribuidora de Gas S. A. and Vel-a-gas Co., of Mexico City, and an important member of the liquefied petroleum gas industry of the Republic of Mexico, was a recent visitor to the States. He flew his plane, which operates either on butane or on gasoline, to Brownsville, then continued by transport plane to San Antonio where he visited R. L. Edwards, of Edwards Gas Appliance Co.

Mr. Vela's company owns eight railway cars of approximately 10,000 gals. capacity, each, which are utilized in transporting of LP-Gases.

◆ ◆

W. H. Vogan Returns to A.G.A. Laboratories in Cleveland

W. H. Vogan, supervisor of the Los Angeles branch of the American Gas Association Testing Laboratories, has been recalled to the Cleveland Laboratory to engage in work directly connected with the war effort, according to word received from R. M. Conner, director of the Laboratories. Fred Allen, who has been assistant supervisor of the Los Angeles branch, will act as supervisor during Mr. Vogan's absence.

See our Automotive Manager

"ASK HIM to show you all of our trucks and then give us an estimate on the cost of converting each of these units to Butane operation. I understand that Ransome is 'tops' in making motor conversions which will save us considerable money on our long hauls."

RANSOME COMPANY

Designing and Constructing Engineers

4030 HOLLIS STREET · EMERYVILLE, CALIFORNIA

Ransome

ANNOUNCEMENT

Conservation of scarce metal is demanded as a part of the victory effort. In order to do our part in this conservation program our stocks of carburetion equipment and parts must be held to a minimum.

Effective July 1st we will close our Dallas Branch for the duration.

Complete stocks will be maintained at our Chicago Branch, 2644 South Michigan Avenue, Chicago and at our Main Office at 7010 South Alameda Street, Huntington Park, California.

Address the office nearest you where we will endeavor to give the same service our Dallas Branch has rendered in the past.

Yours For Victory

ENSIGN

CARBURETOR CO., LTD.

HUNTINGTON PARK, CALIF. • DALLAS, TEXAS • CHICAGO, ILL.

Jap and Insect Invasions Both Look Alike to Butane Sprayers

IF Japanese bombs should fall in the vicinity of Santa Paula, Calif., they will be met by a fleet of butane spray rigs that will make them harmless in a jiffy.

While intended for far more domesticated and peaceful pursuits, 17 pieces of mobile equipment belonging to "Associates Insectary" are ready day and night to swoop down upon incendiary bombs or to suppress brush and forest fires, be they the work of saboteurs or set by careless smokers. The large water tanks on the spray trucks perform this service. This defense battery is listed with the Ventura county fire department and subject to emergency call at any time.

Top of page: Fleet of butane spray trucks at Santa Paula, Calif., headquarters.

For five years it has successfully fought brush blazes and did valiant work in suppressing the big brush fire of 1939.

However, for most part the spray rigs and delivery trucks perform the more routine but nevertheless essential tasks of controlling parasites and insect pests in the citrus groves of Ventura county. No insect invasion can hope to be any more successful than one instigated by the Japs while this equipment is on call.

Associates Insectary is an association that sells its tree spraying services to orchardists. Of its 17 units, 11 spray rigs and one truck have been converted to butane and if the necessary equipment can be made available the remaining four spray rigs and a second truck will

be changed over in the near future. All units are Ensign equipped.

Planning to make the fleet 100% butane is the result of the fine success that has attended the operation of the butane units to date, according to W. C. Beckley, manager of the company. Closely kept cost and performance records show that the use of butane has effected a saving of 50% in fuel on truck operation and 63% on the motors propelling the spray pumps; there has been a substantial decrease in necessary mechanical repairs needed, and starting of cold motors has been found much easier. Last year the 12 units using butane consumed 22,057 gals. of fuel.

One man alone, Mr. Barger, has charge of all refilling operations. This policy reduces the chances of accidents, Mr. Beckley believes.

Lately, "foot power" has been substituted for butane and gasoline, as well, in carrying men to and from their work and the locations of equipment in the field. Six bicycles and one scooter have been provided to reduce the tire wear on the trucks.

E. L. Smith, assistant manager, and W. C. Beckley, manager, Associates Insectary, beside one of the butane spray tanks.

The successful conversion of so many automotive units to butane

▼

Manager Beckley (left) inspecting butane truck and chemical trailer before leaving for the field.

▲

B. Barger is the only man allowed to fill the butane tanks.

is credited to the Ventura Butane Corp., of which P. E. Lynch is manager. This company has dispensing stations in Ventura, El Rio and Santa Barbara, Calif., makes conversions, carries repair parts, and maintains 24-hour service at all plants.

◆ ◆

Dealer Buys Gasoline Station To Augment War-Time Income

Emory S. Kelley, president of Butex Gas Co., of Houston, Texas, announces that he has purchased the gasoline filling station across the street from his location on Washington Ave., Houston, as part of his program for meeting more trying sales conditions for the balance of the war period. The butane business of his company will now operate from the new location just purchased at 3628 Washington. Mr. Kelley has found that his butane customers are also in the market for gasoline and are glad to have his filling station attendants service their automobiles with oil, grease and accessories. He will operate both businesses at the same location and at little more expense than operating the single business before.

Butex operates five butane tank trucks. Mr. Kelley is on the executive board of the newly formed Texas Liquefied Petroleum Gas Association, Inc. Miss Eunice J. Best is secretary and treasurer of the company.

◆ ◆

Crook Co. Installs Plants In Imperial Valley, Calif.

The Crook Co., of Los Angeles, recently completed the installation of a bulk butane plant in the city of Imperial, Imperial Valley, Calif. The plant has a storage capacity of 10,000 gals.

Crook Co. trucks will distribute fuel from the new plant to many farmers throughout the valley who are depending on butane for domestic and farm uses.

A second LP-Gas installation recently completed by Crook Co. is the new butane service station at the Signal Service Station in El Centro.

To Defeat Air Attack Dangers Learn How to Extinguish Bombs

IF an incendiary bomb were to fall upon your property, how would you extinguish it? For those who wish to be prepared for emergencies, the suggestions in the recent bulletin of the Safety Research Institute, of New York reprinted below, will be invaluable.

Military authorities have not minced words in warning repeatedly that this country must be prepared to defend itself from air attack. The logical aim of war from the skies is the disruption of civilian and industrial life with consequent high-cost-of-interruption to production and morale. And the weapon which it is expected will be used most is the fire bomb.

Examine Present Equipment

The first step in preparing against such anticipated attack is a thorough check-up of fire fighting equipment now in place. Alarm and sprinkler systems and fire extinguishers are false promises of security unless they are ready for instant use when danger strikes. Alarming reports of the sabotage of fire extinguishers in different sections of the country emphasize the importance of regular check-ups and a 24-hour guard over all fire fighting apparatus.

Factories, hotels, schools, department stores and many other industrial, institutional and commercial establishments are already equipped with approved fire extinguishers. They can be supplemented by buckets of sand and long-handled shovels. These are the common and safe weapons for fighting the light magnesium incendiary bomb effectively, as demonstrated in "Fighting the Fire Bomb," the training film approved by the Office of Civilian Defense.

As stated in the bulletin, there are two phases to the burning of the magnesium bomb. The first stage is the violent burning of the thermit igniting charge within the body of the bomb, when melted metal and flames spurt for several feet. During this active eruption, which lasts for about a minute, no attempt should be made to approach the bomb. It is important to watch and wait at a safe distance, especially since the bomb may contain an explosive charge which will go off during the thermit reaction.

This thermit reaction ignites the magnesium, which continues to burn quietly for 10 to 20 minutes, if left undisturbed. In this second stage, the bomb can be approached closely and fought with water spray. At this point, extinguishers enter the picture.

All types of extinguishers discharging water or chemicals dissolved in water can be used directly on the bomb itself, if their normally solid streams are converted into a spray by "thumbing" the stream at the nozzle. These include the pump tank (with or without anti-freeze solution), the soda-acid, foam, loaded stream and gas-cartridge types.

Water Spray Speeds Combustion

The use of water spray serves two purposes. It speeds up the combustion of the bomb, so that it burns out quickly; it also serves to wet down the area around the bomb and restricts the spread of fire. It will ordinarily require two 2½ gal. units to

dispose of one bomb and its surrounding fire.

A course spray of water helps control the burning bomb; a solid stream causes it to flare up explosively. The solid stream of the extinguishers, however, can be used on fires started by the bomb. Take care to keep the stream away from the bomb itself.

Although only water-filled and water-solution types of extinguishers are effective on the bomb itself, the vaporizing liquid (carbon tetrachloride base) and carbon dioxide types can be used on fires started by the bomb, just as they are used on fires started from any other cause.

If the bomb can be approached before it has set fire to its surroundings, dry sand can be used. The sand is shoveled over the burning bomb simply to cut down its radiant heat; sand does not extinguish the bomb. Covered with sand, the bomb can be scooped up in a shovel and dropped into a metal pail, in which a layer of several inches of sand has been placed. By running the handle of the shovel under the handle of the pail, to protect the hands from heat, the sand-smothered bomb can be carried from the premises and dumped where it will burn itself out harmlessly.

To use this fire fighting equipment with maximum efficiency, industrial workers must understand its operation. Approved fire extinguishers should be quickly available in any part of the structure, and every man on the job should know how to use them. Actual fire extinguisher drills are the most effective way to get the "feel" of an extinguisher.

Regular recharging of all fire extinguishers is part of the preparedness program. Frequent inspections are an added precaution against sabotage and give assurance that these protective units are in good operating condition, ready for immediate use.

This is the light magnesium incendiary bomb commonly used by the Germans. It weighs about two pounds.

FOR 57 YEARS
A Constant Search for Perfection

MORE THAN A MILLION OF THE GAS INDUSTRY FOR OVER 57 YEARS

BUY WAR BONDS

MORE SPEEDS PRODUCTION FOR DEFENSE

★ For over 57 years the goal of the Geo. D. Roper Corporation has been to build the finest in a modern gas range. That *was* our one big job.

NOW ROPER HAS ANOTHER JOB — more important than any we have ever tackled in the past. That job is adding man power and production facilities to building the sinews of war. This is being carried out vigorously.

Roper is also actively furthering the Nutrition Program. Experimental kitchens are developing new ideas, new menus that contribute more and more to the health of the nation. Thousands of Roper Gas Ranges in use are saving time, food, fuel.

Send today for sample of booklet entitled "Care and Operation of the Roper Gas Range." This book will help your customers follow the CONSERVATION and NUTRITION program recommended by the government.

ROPER
GAS RANGES
the nation over are on the job every day —saving vitamins, conserving food, building strong muscles and sturdy bones for the all-important work that lies ahead.

GEO. D. ROPER
CORPORATION
GENERAL SALES OFFICE AND PLANT: ROCKFORD, ILLINOIS

ROPER GAS RANGES FOR ALL GASES INCLUDING **(LP)** LIQUEFIED PETROLEUM GAS

RESEARCH

• **EACH MONTH a competent staff reviews more than 70 publications serving the oil, gas and affiliated industries in a search for those published articles of value to technicians and executives in the liquefied petroleum gas industry. In this department of BUTANE-PROPANE *News*, brief abstracts of such articles are presented.—Editor.**

Butadiene Calls for Few Departures in Equipment or Processing—J. V. Hightower. *Refiner*, April, 1942, pp. 101, 102. Although the petroleum refining industry in turning to the production of raw materials, chiefly butadiene, for the manufacture of synthetic rubber is entering a different field, this does not mean that plants will require radically different equipment and fundamentally different processes from those used in production of ordinary petroleum products. In general, the details of a butadiene installation will be familiar to any experienced stillman of a cracking unit, and it is unlikely that he would require any special course of training in order to operate an installation.

Bearings and Lubrication — R.J.S. Pigott. *Mechanical Engineering*, April, 1942, pp. 259-269. In these days, the lubrication of certain classes of bearings, particularly those employed in heavy-duty, high-speed, internal-combustion engines and in automotive and aeronautic equipment generally, has become in many cases acutely troublesome. Apparently a good deal of this difficulty is due to the fact that the theory of the bearing has not been developed to practical application although the major basis of this work was Osborne Reynolds' theory, published in 1886; and even such theory as we have is receiving scant attention, especially among automotive designers. Observation has shown that a great deal of this trouble can be avoided by making some real use of what is already known about the operation of bearings. Author discusses: Principles of ordinary bearing; Types of lubrication; The Reynolds wedge; The case of actual bearings; The function and effect of oil; Effect of grooving; Theories of film breakdown; Use of babbitt; Cooling of oil neglected; Examples of copper-lead bearing surfaces; Troubles avoided by attention to design; Grease and solid lubrication; Ball roller bearings.

Performance of Refinery Gas Absorbers With and Without Intercoolers—R. M. Jackson and T. K. Sherwood. *National Petroleum News*, April 29, 1942, pp. R-134, etc. The data describing full-scale refinery absorber operations on cracking coil gas will be helpful to plant operators now concerned with the recovery of selected hydrocarbon compounds for the manufacture of 100-octane aviation gasoline, butadiene for synthetic rubber and other essential wartime products coming from a petroleum base. Results, including percent recovery of the component compounds, are given for winter and summer operations, both with and without intercoolers. The data given show the effectiveness of the intercoolers in boosting recovery rates. In terms of total absorption the intercooler was more effective in winter because of lower cooling-water temperature.

Fourteen Refiners Participate in Synthetic-Rubber Program—*Oil and Gas Journal*, April 9, 1942, pp. 16, 17. Contracts have been negotiated with 14 oil-refining companies, 7 chemical concerns, and 4 of the nation's largest rubber-manufacturing concerns that

will assure production of 700,000 tons of rubber annually. The plants participating in the contracts and agreepating in the contracts and agreements, announced by Rubber Reserve Co. and Defense Plant Corporation, will go into operation over the next 18 months. The 14 oil-refining companies are listed.

Shake Hands with Butadiene—*Petroleum World*, April, 1942, pp. 23-25. The following questions are answered in this article: What is butadiene? What are some of its properties in terms of things an oil man knows about? How does it fit into synthetic rubber manufacture? How is it likely to be made at the refinery? How will it be transported to the rubber plant? What role will the Pacific Coast refining and natural gasoline industries play in this race to replace a strategic material lost to the enemy?

Formation of Hydrocarbon Hydrates—I. C. Bechtold. *California Oil World*, 2nd March, 1942, pp. 11, etc. Part 1. Author discusses literature on, and chemical nature, composition, and conditions ideal for the formation of hydrates. A.C.N.G.A. paper.

Electrical Protection and Use of Light-Weight Pipe in Pipe-Line Construction—W. F. Rogers. *Petroleum Engineer*, March, 1942, pp. 71-74. Protection of pipe against external and internal corrosion by modern available methods can lead to great economies in the use of steel.

Effect of Pressure on Enthalpy of Pentane, Heptane and Iso-octane—E. R. Gilliland and M. D. Parekh. *Industrial and Engineering Chemistry*, March, 1942, pp. 360-362. Data have been obtained on the isothermal enthalpy changes with pressure for n-heptane, n-pentane, and iso-octane by an experimental technique. The pressure and temperature ranges covered are 200 to 2900 lbs. per square inch and 330° to 660° K., respectively. The data are compared with those of other investigators.

Vapor Pressures and Critical Constants of Isobutane—J. A. Beattie, H. G. Ingersoll and W. H. Stockmayer. *Journal of American Chemical Society*, March, 1942, pp. 546-548.

The Compressibility of and an Equation of State for Gaseous Isobutane—J. A. Beattie, H. G. Ingersoll and W. H. Stockmayer. *Journal of American Chemical Society*, March, 1942, pp. 548-550. Measurements of the compressibility of gaseous isobutane are reported from 150° to 275° and from a density of 1.0 to 9.0 mole/liter, the maximum pressure being 250 atm. In a glass-lined bomb isobutane did not polymerize seriously during a 10-hour period until 275° was reached. The constants of an equation of state of gaseous isobutane were determined from the data up to the critical density; and the values of the second virial coefficients determined from the experimental data are given from 150° to 275°.

La Gloria Condensate Recovery Plant Unusual Joint Enterprise—Neil Williams. *Oil and Gas Journal*, Jan. 1, 1942, pp. 30, etc. The largest operation of its kind, the new condensate-recovery and recycling plant of the La Gloria Corp. will have a capacity of 225,000,000 cu. ft. daily. The field is located in Jim Wells and Brooks counties, Texas, and has a highly diversified ownership with ten separate lease holders and numerous interests involved.

Francitas Gas Company's Cycling Plant, Jackson County, Texas, Extracts Condensate at High Pressures—F. H. Love. *Petroleum Engineer*, Jan., 1942, pp. 72, etc. Liquid products recovered from gas phase by multiple-stage "concurrent" absorption method; Wellhead pressure of 2800 lb. per sq. in. reduced at plant to 2000 lb.; Gas returned to sand at 2920 lb. pressure.

List of Inspected Gas, Oil and Miscellaneous Appliances, December, 1941. Published by the Underwriters' Laboratories, Inc.

BANKS TANKS DOMINATE

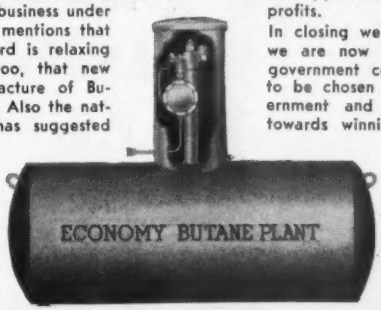
The Butane Industry is "Cheering Up"

By W. W. BANKS

In reading the last (June) issue of the BUTANE PROPANE NEWS I find reflected a new tone of optimism, not a wide-open throttle, full-speed ahead signal but nevertheless a trend toward better conditions in the industry. William F. Lowe, guest editor, states: ". . . the LP Gas marketer has a more stable future than marketers of many another business." Another article points out that sales opportunities for the LP Gas industry are broadening. Still another suggests that the resourceful dealer can find new business under war orders and another mentions that the War Production Board is relaxing restrictions. We find, too, that new facilities for the manufacture of Butane are being installed. Also the natural gasoline industry has suggested various ways and means of increasing the extraction of liquefied petroleum gases with existing equipment. This industry says something must be done about the shocking waste of Butane and gives figures to show how this waste can be converted to critical war products such as synthetic rubber and high octane gasoline.

The foregoing facts and statements by qualified experts support our view that the Butane Industry is "cheering up." This process can be accelerated by all of us making a concerted effort to discontinue bad practices such as: selling fuel too cheap; failing to charge for extra service; by failing to urge customers to completely fill tanks when being serviced for fuel. These, and many other loose practices too obvious to mention, hinder our opportunities to make legitimate profits.

In closing we repeat with pride that we are now working extra shifts on government contracts. We are proud to be chosen for service to our government and to contribute our bit towards winning the war.



● *Our Engineering department will be glad to assist our dealers with technical information.*

● *We are glad to assist our dealers with the latest available information on governmental regulations.*

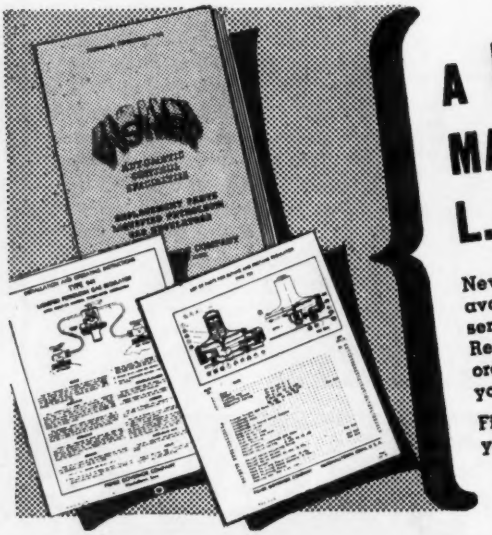
DALLAS TANK AND WELDING COMPANY, INC.
201-5 W. COMMERCE ST. DALLAS, TEXAS

ANSWERS

To Chapter 12
The Bottled Gas Manual

Here are the answers to the questions on Page 39 and which refer to problems in Chapter 12 of THE BOTTLED GAS MANUAL:

1. The area of a circle is πR^2; therefore, $A=\pi R^2$.
   R = ½ of D or .0405 = .02025 in. (2)
   $R^2 = .02025 \times .02025 = .0004101$ in.
   $\pi = 3.1416$
   $\pi R^2 = 3.1416 \times .0004101 =$ .001288 in., the value of A.
   The equation is B = 9,216,000 A.
   B = 9,216,000 × .001288 = 11,872 B.t.u.'s.
2. As the equation is based upon 2519 B.t.u.'s per cu. ft., 11,872 should be divided by 2519, which gives us 4.713 cu. ft. per hour flow.
   Multiplying 4.713 by 2600 we arrive at 12,253 B.t.u.'s per hour.
3. .003
4. .00214
5. .003 plus .00214 = .00514. To get the average, divide by 2, this giving us .00257 in. of circumferential length



A NEW SERVICE MANUAL for FISHER L.P.G. REGULATORS

New regulating equipment is no longer available. Regulators now in use must serve for the duration. Maintenance of Regulator Equipment in good working order is vital to your customer and to your business.

Fisher's new manual is designed to serve your maintenance needs. It contains sectional drawings, parts lists, instructions and parts prices. Write for your copy today.

FISHER

GOVERNOR COMPANY
938 Fisher Building
MARSHALLTOWN, IOWA

New Target for Industry:

More Dollars per Man per Month in the PAY-ROLL WAR SAVINGS PLAN

TO WIN THIS WAR, more and more billions are needed and needed fast—AT LEAST A BILLION DOLLARS A MONTH IN WAR BOND SALES ALONE!

This means a *minimum* of 10 percent of the gross pay roll invested in War Bonds in every plant, office, firm, and factory in the land.

Best and quickest way to raise this money—AND at the same time to "brake" inflation—is by stepping up the Pay-Roll War Savings Plan, having every company offer every worker the chance to buy MORE BONDS.

If your firm *has* already installed the Plan, *now is the time*—

1. To secure wider employee participation.
2. To encourage employees to increase the amount of their allotments for Bonds, to an average of at least 10 percent of earnings.

If your firm *has not* already installed the Pay-Roll War Savings Plan, *now is the time to do so.* For full details, plus samples of result-getting literature and promotional helps, write, wire, or phone: War Savings Staff, Section E, Treasury Department, 709 Twelfth Street NW., Washington, D. C.

U. S. War Savings Bonds

This space is a contribution to America's all-out war program by

BUTANE-PROPANE News, 1709 W. 8th St., Los Angeles

AMERICAN
Safe
BUTANE AND PROPANE TANKS
AMERICAN
PIPE & STEEL CORPORATION
Manufacturers and Distributors
ALHAMBRA CALIFORNIA

DEARBORN GAS HEATERS
The Quality Line with Outstanding
SELLING FEATURES
- COOL CABINETS
  REVOLUTIONARY SAFETY FEATURE
- HI-CROWN BURNER
  THE MIRACLE L.P.G. BURNER
- BLUE FLAME PILOT
  AUTOMATIC LIGHTING FOR SAFETY
- RICH-WOODS FINISH
  BEAUTY OF FINE WOOD. DURABLE
- SIFONAIRE CHASSIS
  PATENTED. NOTHING ELSE LIKE IT
- A.G.A. APPROVAL
  18 MODELS ALL L.P.G. APPROVED

DEARBORN STOVE COMPANY
3256 MILWAUKEE AVE., CHICAGO
3601 SO. GRAND AVE., LOS ANGELES

per B.t.u. passed per hour.

$\frac{16}{.00257}$ =6225 B.t.u.'s per hour.

6. The spacing of No. 32 ports should be 3/8-in. on centers. Twenty-one inches can be divided into 21÷3/8=56 spaces. As one extra port is needed to define the boundaries of 56 spaces, 56+1=57 ports.

7. From 5/8-in. to 7/8-in.

8. To allow the products of combustion to escape.

9. A. The smallest area of the mixing tube should be at least 45% of the total area of the ports.

   The area of a single No. 32 MTD port is .01057 sq. in.

   The total area of 200 ports would be 200×.01057=2.114 in.

   45% of 2.114=.45×2.114= 0.95130 sq. in.

   The area of a circle is πR^2

   $\pi R^2 = 0.95130$

   $\pi R^2 = \sqrt{\frac{0.95130}{3.1416}}$

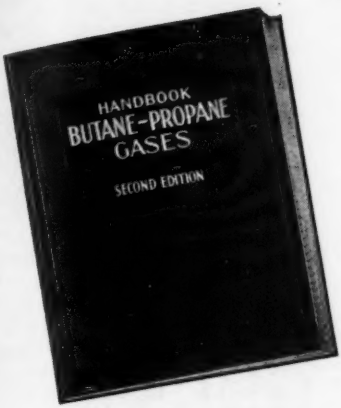
   $R = \frac{.975}{1.7724} = .5501$

   The diameter is twice the radius, so 2 × .550 = 1.1002 in., internal diameter of the mixing tube at its smallest point.

   B. The length of the mixing tube should be 6 times its smallest internal diameter, so 6×1.0002=6.6012 in. long.

10. 3×.0420=.1260 in.

WHILE THEY LAST



A Limited Quantity
2nd Revised
Edition

HANDBOOK BUTANE-PROPANE GASES

Available at

SPECIAL QUANTITY DISCOUNTS

Soon to be Replaced by 3rd Edition but Ideal for Staff Education and Instruction on LP-Gas Fundamentals

A new edition of the HANDBOOK BUTANE-PROPANE GASES soon to be published makes it possible to now offer the current "2nd Revised" Edition, of which thousands have been purchased at the regular $5.00 figure, at these Special Quantity Discount prices:

1- 3 copies	**$5.00 each**
4-10 copies	**$2.50 each**
11-25 copies	**$2.00 each**
Over 25 copies . . .	**$1.50 each**

(Plus Postage)

CONTENTS: Semi-Bulk Distribution; Use of Butane in Buses; Combination Propane Operated Utility Plant; Use in Internal Combustion Engines; Design and Installation of Storage; Supply from Petroleum Refineries; Engineering Data on the Lower Olefins; Domestic Appliance Testing and Utilization; Economical Comparisons with Coal, Oil, Electricity, Producer Gas, Manufactured Gas; Town Plants; Manufacture from Natural Gas; Special Uses; Volume Correction Factors; Transportation; Use with Other Gases; Analysis and Testing; Properties of Mixtures; Bottled Gas Distribution; Bibliography; Central Plant Directory; Catalog Section. 415 pages. If you live in Canada add 10% excise tax; in California add 3% sales tax.

We pay the postage on orders accompanied by remittance.

PUBLISHED BY WESTERN BUSINESS PAPERS, INC., PUBLISHERS OF

BUTANE-PROPANE *News*

1709 WEST EIGHTH STREET **LOS ANGELES, CALIF.**

Exceptions Are Being Granted

MANY dealers are finding it possible to make sales in their territories to individuals and firms so situated that they qualify for gas or equipment under industry orders which provide for exceptions for those who are engaged in essential enterprises or have no substitute for LP-Gas and appliances.

The two accompanying applications were made to the Plumbing and Heating Branch of the WPB and granted. The first on April 21 and the second the following day. They may be of assistance to dealers who have similar prospects.

•

Application No. 1

E. (1) One 150-gal. underground butane gas system, 60 ft. of ¾-in. black pipe.
(2) No priority assistance required.

F. Other fuel cannot be used because this is a new house which has just been finished and no provision is made for burning coal or wood. There are no flues or chimneys as the consumer planned on using butane gas for heating and cooking. Natural gas is not available.

G. Installation will be of permanent character.

H. Installation will be used year around.

L. This equipment will replace no other fuel consuming appliances as it is a new home just completed.

J. Equipment is designed for butane mixture and approximate monthly consumption 30 gals.

K. This consumer has no other means of heating or cooking as this house was built with the idea of using butane gas. There is a definite shortage of small homes in this Defense area and providing this equipment for this small home will be the means of housing another family.

Application No. 2

E. (1) One 150 gal. underground butane gas system, 60 ft. of ¾-in. black pipe.
(2) No priority assistance required.

F. Products produced through the use of this installation, will be hogs, eggs and poultry. Natural gas service is not available. Egg production approximately 300 dozen per month.

G. Installation will be of permanent nature.

H. Installation will be used year around.

I. This equipment will replace no fuel or fuel consuming appliance.

J. Chicken brooders are designed for butane mixture and month's consumption will be approximately 50 gals.

K. We understand that the production of chickens, eggs and pork, is a very essential part of the Defense program and the granting of this request will be the means of installing equipment which will satisfactorily and economically provide the means of increasing the above production.

◆ ◆

J. C. Wayne Will Handle Sales Promotion for Hotstream

J. C. Wayne has been appointed advertising and sales promotion manager of Hotstream Heater Co., Cleveland, succeeding O. A. Reiter, who has resigned to join the War Production Board in Washington.

LEAK-PROOF
UNDER PRESSURE

Rochester Criterion Gauges because of their *patented, leak-proof* type of construction are capable of withstanding up to 2000 lbs. pressure thus assuring that *extra margin of safety* so essential in the handling of liquefied petroleum products. Guaranteed accurate and listed as Standard by Underwriters Laboratories.

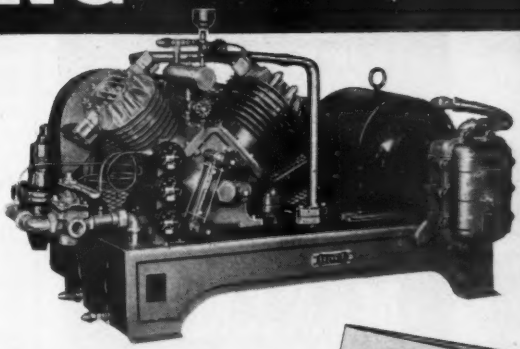
Rochester Mfg. Co., Inc., 17 Rockwood St., Rochester, N. Y.

ROCHESTER *Criterion* GAUGES

SPEED UP TANK CAR UNLOADING

RUNNER LP-GAS UNIT Reduces as Loss... Pays Dividends Daily

ere's a unit which not only recovers 00 to 1000 additional pounds of as per tank car unloaded, but also peeds up car unloading. In addition, e Brunner LP-Gas Unit cuts bottle fill- g time by as much as 25%. Add up ese savings—see how Brunner Units uickly pay for themselves. Brunner anufacturing Co., Utica, N. Y., U. S. A.



BRUNNER

Write for FREE Booklet

The new booklet describes the Brunner LP-Gas Unit, contains illustrations, diagrams and other pertinent facts on handling liquid petroleum gas.

OR OVER 30 YEARS THE SYMBOL OF QUALITY

BUTANE
PROPANE

for all requirements— A superior quality assured. Delivery by rail or truck transport.

Clute Petroleum Company
National Bank of Tulsa Bldg.
Tulsa, Okla.

McNAMAR Tanks

- TRUCK TANKS
- TRANSPORTS
- SKID TANKS
- STORAGE TANKS
- UNDERGROUND SYSTEMS

All tanks ASME U-69, inspected by Ocean Accident & Guarantee Corp., Ltd

McNAMAR
BOILER AND TANK COMPANY
Tulsa, Oklahoma Salem, Illinois

L. H. Hughes Is Now Sole Owner Of Oklahoma Automatic Gas Co.

L. H. Hughes has purchased the interest of C. Ralph Jones in the business of the Oklahoma Automatic Gas Co., 16 West California Ave., Oklahoma City, Okla., and is continuing operation at the same location.

For the past several years Messrs. Jones and Hughes have operated as a partnership. During that time they established local dealers throughout the state.

Mr. Hughes, for the present, is concentrating on sale of liquefied petroleum gas and servicing and repairing LP-Gas appliances. However, he has a large stock of ranges, heaters, and fittings which he is holding subject to disposal as WPB or priority ratings may permit.

Some of the appliances were taken over from Joe Blickenstaff, who operated as local dealer for the Oklahoma Automatic Gas Co., in the Oklahoma City area under the name of The Automatic Gas Appliance Gas Co. Mr. Blickenstaff has removed to San Antonio, Texas where he is attending an aviation defense school.

◆ ◆

Geo. D. Roper Corp. Offers Many Dealer Aids

The May, 1942, issue of Geo. D. Roper Corp.'s "Roper Ranger" carried numerous examples of newspaper ads, displays, direct mail, charts, radio "spots," and booklets planned to aid dealers in "helping the cause of victory by featuring the nutrition story and healthful cooking."

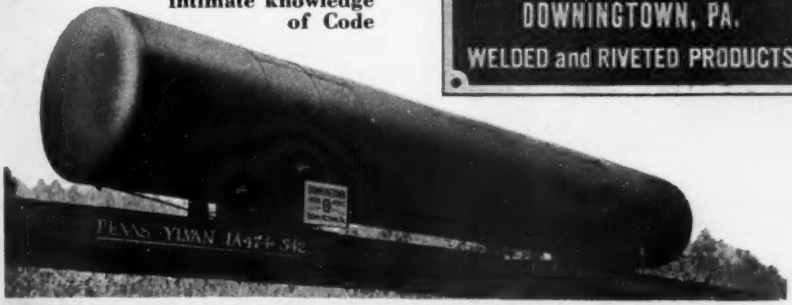
Consolidation of all efforts into one program is urged. Some suggestions are: (1) Provide employes with facts on nutrition; (2) hold food classes for women's groups; (3) cooperate with all local war services; (4) set up floor nutrition booths and displays.

Why U-69 ? . . . .

● *All* Downingtown-fabricated tanks for Propane storage are welded in accordance with Par. U-69 of the A.S.M.E. Unfired Pressure Vessel Code . . . because we know that only tanks so welded adequately protect you against accident!

This is just one way in which our intimate knowledge of Code requirements helps make better tanks for Propane storage. You'll find our specialized experience in fabrications for this service is a time-saving, money-saving asset.

DOWNINGTOWN IRON WORKS
DOWNINGTOWN, PA.
WELDED and RIVETED PRODUCTS



MUNITIONS
Have Taken Their Place

Cavalier production lines and Cavalier's veteran workers are all-out on new jobs today. The manufacture of vital war materials has replaced the manufacture of the Cavalier Ranges that won such immediate acceptance throughout the industry, in just a few short years. Cavalier has been delivering munitions for months now—ahead of schedule—and our facilities are being increasingly utilized for Victory production. Later—when Cavalier Ranges again take their place on Cavalier assembly lines you can expect a new, even better product—for research goes on even when production can't.

★ Cavalier GAS RANGES ★
CAVALIER CORPORATION
341 W. FIRST ST.
CHATTANOOGA, TENN.

Texans Vote Delivery Restrictions

J. H. Winton, president, and R. L. Edwards, vice president, Texas L. P. G. A.

THE regional districts of the Texas Liquefied Petroleum Gas Association, Inc., have recently adopted a resolution calling upon the consumers of liquefied petroleum gases to fill their respective tanks to capacity when purchasing fuel in order that dealers of the industry can conform by intent and purpose with the general orders (ODT Nos. 5 and 6) issued by the Office of Defense Transportation relating to conservation of motor equipment, gasoline, tires, and services.

Felix Shaw, executive secretary, Texas L. P. G. A.

Special deliveries should be limited to emergencies, it is recommended.

The resolution originated with the North Texas regional district which first adopted it. Then it was sent by the executive secretary of the state group, Felix Shaw, to other districts which likewise adopted it.

The regular June meeting of the North Texas district was held the night of June 1 at Hotel Blackstone, Fort Worth. W. E. Hulsizer of the War Production Board was special speaker. The dealers attending had an opportunity to ask many questions.

◆ ◆

LP-Gas Ready for Emergency If Pacific Coast City Bombed

In one large city on the Pacific Coast officials are enlisting LP-Gas as a part of their defense set-up. If bombs should fall and disrupt the regular gas supply, bottled gas will quickly take over the job of furnishing fuel at prearranged disaster relief headquarters.

Such headquarters, located in public buildings throughout the city, will be used for first aid and food supply stations. Cooking and heating stoves are already available and will be operated on present fuel supplies as long as there is no interruption of service. In case of a shut-off, the bottled gas will supply fuel for cooking food and for hot water and heat. The emergency fuel could be ready for use in less than half an hour. This supply could be utilized for an unlimited period of time, making it possible to care for wounded and feed bombed-out persons throughout the city.

Fittings, regulators and necessary pipe for the installations have been prepared. Detailed sketches of each set-up are available for the plumbers who have offered to make the installations. The pipe and fittings are held in readiness at the points of use while the bottles of LP-Gas have been set aside at fuel depots in the city ready for instant transportation to the objective points.

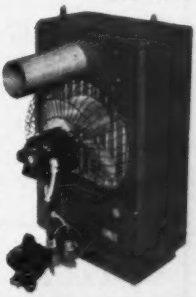
YOU'LL SAVE MANY HOURS OF INSTALLATION TIME BY SELECTING REZNOR SUSPENDED GAS UNIT HEATERS—

They do 24 hour service in 135 Army and Navy establishments and in plants of countless war contractors

It requires less time AND FEWER MEN to install Reznor Suspended Gas Fired Unit Heaters. Furthermore, 89% less of hard-to-get vital materials are required than for cast radiation systems. In addition, Reznor Heaters distribute MORE WARM AIR IN WINTER, GREATER AIR CIRCULATION IN SUMMER. One manufacturer of airplane parts said: "We feel very fortunate in having them (Reznors) installed in our plant." Write today for catalog showing all types and sizes of heaters.

REZNOR MFG. CO.
301 James St., Mercer, Penna.

BACK VIEW



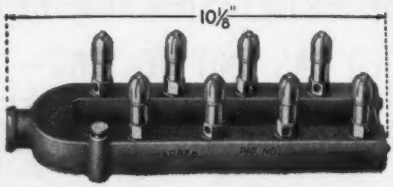
"GAS HEATERS EXCLUSIVELY SINCE 1888"

WARREN
Liquefied Petroleum Gas

Warren's Butane and Propane are taking their place in giving "all out" support to the war effort, as pledged by the LP-Gas Industry.

Naturally, the daily progress and growth of the war effort makes increasingly greater demands for these two fuels, but Warren is doing its part to meet these demands through increased production, construction of new plants, and additions to our tank car fleet.

Warren Petroleum Corp.
TULSA • • OKLAHOMA



No. C. L.-80 Barber Burner

BARBER APPLIANCE BURNERS

The burner is the heart of the appliance. Barber Burner Units are correctly designed, with the proper jets, to fit the individual appliance, and give complete combustion on Butane-Propane Gas. Appliance makers and fuel distributors assure better service and economy for their customers by recommending the use of Barber Burners. Submit your burner problems to us. Catalog of complete line on request.

THE BARBER GAS BURNER CO.

3704 Superior Ave. Cleveland, Ohio

Order These Famous L. P. Gas Products From Us . . . .

REGO LAP WELD

The BASTIAN-BLESSING Co.

THE DAYTON-DOWD CO.

Hackney

BUTANE-PROPANE CYLINDERS

L. C. RONEY INC.

The IMPERIAL BRASS MFG. CO.

GAS EQUIPMENT CO., INC.

2620 South Ervay Street, Dallas, Texas

GAS EQUIPMENT SUPPLY CO.

Trade Journal Advertising Approved by U. S. Government

Advertising to the consumer is not an "admissible cost" of performing Army or Navy production contracts for the Government, according to a booklet, "Government Contract Cost Determination," issued last month. The underlying principle is that "as a general rule advertising is an inadmissable item of cost, on the reasoning that advertising is not required in order to do business with the Government."

An exception, however, is made "for certain kinds of advertising of an industrial or institutional character, placed in trade or technical journals, not primarily with the object of selling particular products but essentially for the purpose of offering financial support to such trade or technical journals because they are of value for dissemination of trade and technical information for the industry and not really an advertising expense to effect sales so much as an operating expense incurred as a matter of policy for the benefit of the business and the industry."

The booklet, the Government auditor's guide in approving war production bills, is available from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 10 cents.

◆ ◆

American Gas Association Annual Convention Cancelled

The Executive Board of the American Gas Association at its meeting in New Orleans, May 4, cancelled the Annual Convention heretofore set for San Francisco in September, 1942. A committee will be appointed by President Hawley to consider the time and place for a proposed annual business meeting.

For Greater STABILITY

IN DEHYDRATED BUTANE AND PROPANE

A Higher Quality Product . . . . A More Dependable Source of Supply . . . . A Product that will secure for you a list of customers more satisfied with a fuel giving trouble-free and efficient service . . . . try Carter Propane and Butane.

Write for complete information to: The Carter Oil Company, Marketing Department, Room 928, National Bank of Tulsa Building, Tulsa, Oklahoma.

DEHYDRATED

Propane and Butane

THE CARTER OIL COMPANY

TULSA, OKLAHOMA

Shipping Points: Seminole, Okla., Stonewall, Okla., St. Elmo, Ill.

WHOLESALE ONLY!

THE QUALITY OF

PAYNEHEAT EQUIPMENT

IS STANDING USERS

IN GOOD STEAD TODAY!

★ ★ ★

Dr. A. E. MacGee, Skelly Oil, Ordered to Active Navy Duty

Dr. A. E. MacGee, manager of Skellysolve and Skellyfuel Division for Skelly Oil Co., who is a Lt. Commander in the U.S.N.R., has been ordered to active duty in the Bureau of Ships at Washington, D. C.

He has long been active in petroleum chemical circles, holding memberships in the American Institute of Chemists, American Chemical Society, American Oil Chemists Society, and the Liquefied Petroleum Gas Association.

In 1938, Commander MacGee was vice president of the American Oil Chemists Society, and in 1927 vice chairman of the Columbus Section of the American Chemical Society.

He attended Southwestern Louisiana Institute, the Louisiana State University, and Ohio State University and was named All-State Quarterback while at Southwestern. He also served as president of the Avatar Literary Society, winning the Judge Julian Mouton debating medal.

Commander MacGee is a member of Phi Lamda Upsilon (Honorary Chemistry Fraternity), Sigma Si (Honorary Scientific Fraternity), Alpha Chi Sigma, and Gamma Alpha (Graduate Scientific Fraternity).

Commander MacGee, who served with the First Division in France and Germany in the last World War, has been with Skelly Oil Co. since 1929.

◆ ◆

Oklahoma License Fees Exceed Costs of Administration

Priorities and freezing restrictions imposed by the war have reduced requirements upon the Oklahoma LP-Gas administrator, Carl C. Garner, in connection with inspection of new installations, but have increased other duties of the department.

Collections of license and other fees up to May 10, 1942, had exceeded the amount of money appropriated by the legislature to cover expenses of the administrator for the fiscal year which ends July 1, 1942. James Archer, chief inspector, reports that collections have been $8,500 as against an appropriation of $7,350.

The department recently compiled and sent to each LP-Gas manufacturer, dealer and distributor, mimeographed sheets carrying 15 questions and as many answers relating to the nature and proper use and handling of butane and propane gas. Administrator Garner requested that each company supply a copy of these questions and answers to each of their customers. These cover in simple language the principal information customers should have to enable them to cooperate fully with the LP-Gas companies in the proper handling and use of LP-Gas fuels.

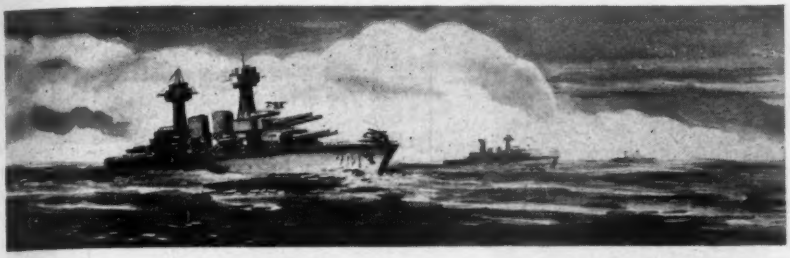
◆ ◆

"The Flow Line" Is New Merco Nordstrom Magazine

First issue of "The Flow Line," a magazine of measurement and control, dedicated to "those who make the wheels go 'round in the gas, oil and process industry," made its appearance recently. It is published by the Merco Nordstrom Valve Co. and Pittsburgh Equitable Meter Co.

The opening article of the first issue of "The Flow Line" was edited by Col. W. F. Rockwell, president of the company, and was titled "Our War Work." A feature article of the 20-page issue is "Pressure Regulation—The Utopian Viewpoint in Relation to Actualities," by Allen D. MacLean, vice president and chief engineer, Pittsburgh Equitable Meter Co.

Editor of the publication is R. S. Reed, Jr. It is published at 400 Lexington Ave., Pittsburgh, Pa.



BE PREPARED WITH ANCHORGAS

Now is the time to check on your future requirements of L. P. Gas. You'll be better prepared with Anchorgas.

In most every emergency you'll find Anchor standing by ready to do their part with a proven L. P. Gas.

Write or wire for complete information today.

★ ★ ★ ★ ★ ★ ★

ANCHOR
PETROLEUM COMPANY
Atlas Life Bldg. Tulsa, Okla.

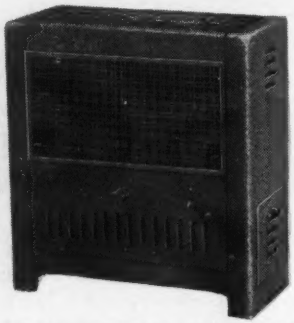
REPLACE OBSOLETE EQUIPMENT WITH BLODGETT BAKING & ROASTING OVENS

"Fifty to 75% of my customers have been using antiquated equipment," states an LP-Gas dealer. "If we can replace it, we will have a heavy and profitable year's work ahead—and we will conserve gas formerly wasted. One of the biggest load builders is the Blodgett Baking and Roasting Oven."

• These efficient commercial units are as easy to sell and to install as domestic units and they increase tank turn-over and so reduce delivery cost!

THE
G. S. BLODGETT CO.
INC.
53 Maple St. Burlington, Vt.

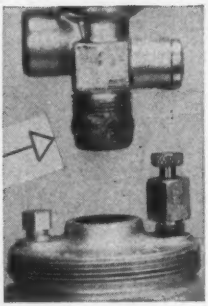
L-P CIRCULATORS



Write today for Catalog and prices of the BRILLIANT FIRE line of High Efficiency Gas Circulating Heaters.

The OHIO FOUNDRY
& MANUFACTURING CO.
Steubenville, Ohio

DEFENSE
AGAINST LEAKS



Bu-Seal
COMPOUND

offers a safe, sure defense against leaks. A modern, new type sealing compound for LP-Gas valves and fittings, BU-SEAL should be a "must" on every dealer's bench. If you haven't used BU-SEAL, order some today!

BU-SEAL OFFERS
Safety . . . Economy . . . Permanence . . .

ELECTRIC AND CARBURETOR
ENGINEERING CO.
"Pioneers of the Butane Industry"
2323 E. 8th St. Los Angeles

Oklahoma Dealer Plans To Weather War Period

A substantial reduction in overhead expenses and tighter restrictions on credit, have enabled Butane Consolidated, Oklahoma City, Okla., LP-Gas dealer, to meet the emergency created by war restrictions, according to W. L. Elkin, owner of the firm.

The company has reduced its field force to three LP-Gas delivery trucks and operators who are qualified also to act as service men. These men are on a salary basis, and feel as much interest in the company as if they were actual partners, Mr. Elkin reports.

"When orders came which froze new installations, except on proper priorities, and stopped the sale of new appliances, we were not caught with a large stock on hand," Mr. Elkin said. "We are now polishing up and repairing our fair-sized stock of used appliances with the hope that we can ultimately at least meet overhead expenses through their sale. We are located on a busy street and may later add a line of used household goods and articles to our stock."

◆ ◆

Experienced Refrigeration Men May Be Needed by Army

The need for men experienced in operating and servicing refrigeration units is anticipated by the army, according to an announcement sent out by Servel, Inc., in response to a request by Maj. R. W. Lewis, from the Caribbean Engineer Division, dated May 19.

It is thought that capable and skilled men who have been employed by Servel or by Electrolux dealers in the past have probably been drafted into the army and their names and draft board numbers are requested so that they may be contacted.

WHEN L-79 THAWS OUT

Reliance Regulator Corporation will be ready for quick reconversion to the production of Regulators for civilian users of Liquid Petroleum Gas immediately after the end of the war. Meanwhile the Reliance Engineering Department is looking ahead for any improvements that can be made in Regulators that have had primary acceptance since the beginning of the LPG industry.

Reliance Regulator Corporation
1800 Meridian Avenue, Alhambra, California
AMERICAN METER CO. U.S.A.

"KEEP 'EM FRYING"
USE **PITCO**
Frialators
REG. U.S. PAT. OFFICE

SAVE FAT . . . GAS . . . SPACE

Deep-Fat Frying at Its Best

★ Customers can serve a wider variety of fried foods.

★ Left-overs or by-products quickly converted into daily specials.

★ Increase in customer business means increase in the gas load.

★ Actual saving in fat alone more than pays total cost of gas required to operate them.

Send for 1942 Illustrated Catalog.

J. C. PITMAN & SONS,
INCORPORATED
711-719 Broad St. Lynn, Mass.

We'll be happy to serve you when it's over!

When the country's best interests again permit expansion of liquefied petroleum gas marketing Philgas will, as before, offer outstanding advantages as a supplier of Propane and Butane

Present customers find that Philgas brings them the most complete production, shipping and service facilities in the industry, together with the assurance of quality products, produced to rigid specifications.

Philgas is proud to share the industry's contribution to serving the nation's needs in the war emergency, and pledges its full participation in the common effort.

Philgas
DIVISION
PHILLIPS PETROLEUM COMPANY

GENERAL MOTORS BUILDING
DETROIT, MICHIGAN

NEW YORK — MILWAUKEE
PHILADELPHIA — ST. LOUIS
CHICAGO — AMARILLO
BARTLESVILLE, OKLA.

THE NATION'S LARGEST MARKETER OF LIQUEFIED PETROLEUM GASES

Gasoline Supply Men Select Officers for New Year

George Probst, Clark Brothers Co., was selected as president of the Natural Gasoline Supply Men's Association, succeeding L. S. Allen, National Supply Co., at the annual meeting May 14-15 in Tulsa, Okla.

Other officers are: Charles D. Peterson, Fisher Governor Co., elected first vice president; A. M. Buxton, Cooper-Bessemer Corp., second vice president; and J. A. Knegel, J. A. Coy Co., treasurer.

◆ ◆

Four Ransome Co. Employes Now Serving In Armed Forces

D. C, Perkins, engineer for Ransome Co., of Emeryville, Calif., is now a lieutenant in the navy. Recently appointed, Mr. Perkins is stationed in the San Francisco area. He was in the navy during the World War I.

Other Ransome men now with the fighting forces include Ed Hawley, with the navy; Bill Ulett, former manager of Ransome Nevada Co., with the army; and Jack Griggs, engineer, with the air corps.

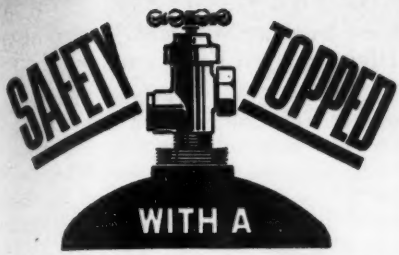
◆ ◆

Jerry Sadler Leaves Texas R. R. Commission for Army

Jerry Sadler, long a member of the Texas Railroad Commission, resigned June 1 to enter the army. His term of office would not have expired until Jan. 1, 1945.

Mr. Sadler has recommended James E. Kilday, now director of the Commission's motor transport division, to succeed him.

Dallas Tank & Welding Co., Inc., baseball club playing Dallas City League baseball under the name of "Tankers." W. W. Gibbons, center, manager and coach, going over line-up with "Smokey" Joe Smith, pitcher. Picture taken in office of W. W. Banks, president of company.



KEROTEST

PROPANE-BUTANE CYLINDER VALVE

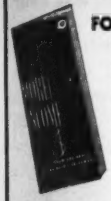
Automatic spring safety vent releases *only* excess pressure.

Diaphragm packless construction assures long service—low maintenance. **WRITE for Catalog**

KEROTEST MANUFACTURING COMPANY
PITTSBURGH PA

ROBERTSHAW MANUALS

will help increase your sales



FOR DOMESTIC SALESMEN

"More Income from Gas Ranges"

How can your salesmen sell more gas ranges? This manual shows simply, graphically, convincingly. Thousands of salesmen have greeted it with enthusiasm, are putting it to effective use.

FOR COMMERCIAL SALESMEN

"Hidden Losses in Your Kitchen and How to Stop Them"

The latest developments in commercial gas cooking equipment are brought together in this manual, now used by many bottled gas dealers.

Write for free copies

ROBERTSHAW THERMOSTAT COMPANY
YOUNGWOOD, PA.

NEED VIKING SERVICE?

Call Your Nearest **VIKING REPRESENTATIVE**

Do you have a pump maintenance problem? Is your pumping installation operating with highest efficiency? Viking's nation-wide sales and service organization would like to help you. Write or call the Viking representative nearest your plant:

★

LOS ANGELES
Viking Pump Company
2040 So. Santa Fe Ave.
Phone Kimball 4470

CHICAGO
Viking Pump Company
549 W. Washington Blvd.
Phone State 6819

CLEVELAND
Viking Pump Company
310 Marshall Building
Phone Cherry 0687

INDIANAPOLIS
Viking Pump Company
320 Pennway Building
Phone Lincoln 4788

KANSAS CITY
Viking Pump Company
601 Pickwick Building
Phone Harrison 8033

BALTIMORE
Wallace Stebbins Co.
Charles & Lombard Sts.

BOISE
The Olson Mfg. Co.
P. O. Box 1487

BOSTON
Hayes Pump & Mach. Co.
125 Purchase St.

BUFFALO
Root, Neal & Company
64 Peabody Street

CINCINNATI
William T. Johnson Co.
210 Vine Street

DETROIT
Kerr Machinery Co.
Kerr Building

DENVER
Eaton Metal Prds. Co.
4800 York Street
Also
Albuquerque Pueblo
Billings Omaha

DENVER
Hendrie-Bolthoff Co.
1635 17th Street

LOUISVILLE
Neill La Vielle
Supply Co.
505 W. Main Street

MILWAUKEE
Viking Pump Company
610 West Michigan St.
Phone Daly 0807

MINNEAPOLIS
Viking Pump Company
35 Holden St.
Phone Main 8247

NEW YORK
Viking Pump Company
1841 Broadway at 60th St.
Phone Circle 7-3324

HOUSTON
Southern Engine & Pump Co.
900 St. Charles Street
Also
Dallas & Kilgore

MEMPHIS
J. E. Dilworth Co.
347 South Front St.

NASHVILLE
General Equipment Co.
Fred R. Watson
612 Broadway

NEW ORLEANS
Menge Pump & Machinery Co.
Masonic Temple Bldg.

PHILADELPHIA
Walter H. Eagan Co.
2336-38 Fairmount Ave.

PITTSBURGH
Power Equipment Co.
Oliver Building

RICHMOND
Richmond Engineering Company
7th and Hospital St.

SAN FRANCISCO
De Laval Pacific Co.
61 Beale Street
Also
Seattle & Portland

ST. LOUIS
Lane Machinery Co.
7th & Market Streets

TULSA
Warner Lewis Company
716 South Troost Street

★

VIKING PUMP COMPANY

CEDAR FALLS, IOWA

Pacific Coast Distributors for Bastian-Blessing L.P.G. Equipment • Dayton Dowd Pump Co.
International Distributors for Day & Night I.C.C. Cylinders
Manufacturers of Vapor Differential Compressors; Roney Valves & Fittings
LARGEST AND MOST EXPERIENCED MANUFACTURING ENGINEERS AND JOBBERS OF L. P. G. EQUIPMENT
Whatever the Need
Whatever the Problem
"WRITE RONEY"
L. C. RONEY INC.
1740-44 W. 59TH ST. • LOS ANGELES, CALIF.

BUTANE and PROPANE
TANK HEADS
A.S.M.E. type
for the manufacturers of
BUTANE & PROPANE TANKS
* * * * STANDARD RADIUS * * * *
* * * * * 80% RADIUS * * * * *
* * * * * ELLIPSOIDAL * * * * *
DIAMETERS UP THROUGH 60"
THICKNESS UP THROUGH 1/2"
Write for Head Catalog
The COMMERCIAL SHEARING & STAMPING COMPANY
YOUNGSTOWN, OHIO.

Carl Golden Now with Ordnance Division, San Francisco

Carl Golden, long connected with the LP-Gas industry on the Pacific Coast, is now with the San Francisco Ordnance Division of the War Department. Mr. Golden's work at the present time deals with fuel allocation and distribution.

Prior to his present appointment Mr. Golden spent more than three months in Washington, D. C. As a representative of the Southern Heater Co. of Compton, Calif., he obtained a 20,000 unit order for water heaters to be used in government defense housing projects.

◆ ◆

A. N. Kerr Sends His Dealers Copies of Industry Orders

As an effective service to its dealers and distributors, the Imperial Gas Co., Los Angeles, has prepared a mailing piece that enumerates and interprets all existing government orders pertaining to the LP-Gas industry, and includes verbatim copies of the orders, themselves. It was compiled by Robert Hardie.

The idea originated with A. N. Kerr, president of Imperial Gas, who thought every distributor would find it convenient to have restriction orders and exception forms arranged in one group for easy reference. (See Page 15 for industry order numbers and their applications.)

◆ ◆

H. H. Heffernan Is In Air Force At Pearl Harbor

H. H. Heffernan, of A. B. Heffernan & Son, Lamesa, Texas, is on a navy bomber at Pearl Harbor, where he has been located since last December. He is a radio operator on a patrol plane.

BU-PRO-FIRE

★

HEATERS AND FLOOR FURNACES FOR L. P. GASES

★

Bu-Pro-Fire Heaters and Floor Furnaces are designed and built especially for use with liquefied petroleum gases. Every Model is finished in "Lifetime" Porcelain Enamel and is guaranteed to give satisfactory Heating Service. A wide range of sizes provides a Model for every heating need. A. G. A. Approved. Write for illustrated catalog and prices.

TENNESSEE ENAMEL MFG. CO.
Nashville, Tennessee

ALGAS
BUTANE PROPANE
CARBURETION

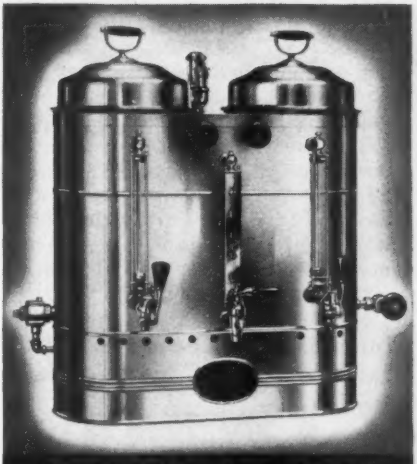
HELPING TO WIN THE WAR!

On the highways—in the fields—and on the industrial front, Algas Carburetion and Algas Standby Plants are proving their merit under wartime stress. Algas men and materials are pledged to winning the war now—and better serving you when it is all over!

American Liquid Gas Corp.
1109 S. Santa Fe, Los Angeles, Calif.

Priority!

UNCLE SAM NEEDS *YOUR* HELP TOO IN CONSERVING ESSENTIAL METALS



PRESERVE THE FINISH

Regular Cleaning Will Prolong the Life of Your Coffee Urn

● Though the production of coffee urns for civilian use has been curtailed, proper care should assure your customers of the long life, trouble-free performance and economical operation characteristic of Blickman urns. Regular cleaning is important. PARTICLES OF COFFEE, FOOD OR ACIDS SHOULD NEVER BE PERMITTED TO LODGE ON THE URN AND REMAIN THERE. They may "bake on"—be impossible to remove without damaging surface—and, on plated urns, may produce corrosive chemical reactions. The type of surface determines the cleaning method. CORROSIVE ABRASIVES SHOULD NEVER BE USED. For stainless steel urns, just the wipe of a damp cloth and the occasional use of an accepted cleaning compound is sufficient.

S. BLICKMAN, INC.
Manufacturers of Food Service Equipment
2107 Gregory Ave. • WEEHAWKEN, N. J.

Oklahoma, Texas Refiners to Build $10,000,000 Plant

News sources state that eight independent refiners of Oklahoma and North Texas have formed the Associated Refineries, Inc., with M. Lloyd Freese, vice president of Bell Oil & Gas Co., as president, for the purpose of constructing and operating a $10,000,000 high-octane refinery near Duncan, in southern Oklahoma.

Plans for the project have been approved by the War Production Board and the Defense Plant Corporation has been given priorities to obtain materials for the plant that will produce 100-octane gasoline and other war materials.

◆ ◆

Robertshaw Issues Booklet On Commercial Thermostats

Robertshaw Thermostat Co., 30 Church St., New York, N. Y., has issued an 18-page booklet, "Robertshaw Thermostats for Commercial Cooking Equipment," which gives information about the advantages, economies, and operation of thermostatic controls for commercial cooking equipment.

The booklet covers various efficient types of thermostats for a wide range of equipment. Data concerning savings and improvement in cookery through correct use of heat, based on long series of tests using scientific thermostatic controls is also presented.

◆ ◆

Listenwalter & Gough Cover So. Calif. For Grand Ranges

Listenwalter & Gough, 827 E. 1st St., Los Angeles, were appointed dealers for Grand Ranges, manufacfactured by the Cleveland Cooperative Stove Co., last Oct. 1, with a territory covering all of Southern California except San Diego county, and that county will be included within the next few weeks. Specifically, they sell in the following counties: Los Angeles, San Bernardino, Inyo, Orange, Ventura, Riverside, Santa Barbara, San Luis Obispo and Kern.

Between Oct. 1 and March 15 the original order of ranges and eight more carloads were sold out to users of liquefied petroleum gases in districts not served by natural gas. Listenwalter & Gough state that they are the largest distributors in the world for many household products which they handle besides Grand Ranges.

◆ ◆

C. J. Bender Gives Services To U. S. Treasury Department

C. J. Bender, of Automatic Gas Equipment Co., Dallas, has accepted appointment as a dollar-a-year man with the Government as a part time executive associated with the Treasury Department. He is engaged in giving talks before merchants and manufacturers and employe groups in connection with salary savings allotment plans.

While engaged in this work for the government, Mr. Bender continues to operate the Automatic Gas Equipment Co. from the headquarters office in Dallas.

◆ ◆

Ensign Dallas Office Closes For War's Duration

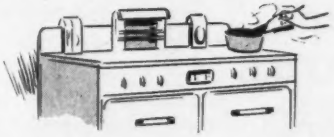
Because of the need to conserve scarce materials for the war effort, which includes holding down stocks of carburetion equipment and parts, the Ensign Carburetor Co., Ltd., closes its Dallas, Texas, branch office July 1 for the duration of the war, according to W. W. Wyker, general sales manager.

Complete stocks will be maintained at the Chicago branch, 2644 South Michigan Ave., and at the main office at 7010 South Alameda St., Huntington Park, Calif.

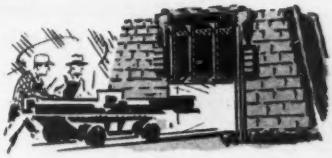
IN TEXAS IT'S
THE BUTANE COMPANY
for
WHOLESALE DELIVERIES
DIRECT TO YOUR BULK
STORAGE PLANT.
the BUTANE Company
• BROWNWOOD, TEXAS
WHOLESALE TRANSPORTERS—DISTRIBUTORS OF BUTANE

For Safety
and Economy
ETHYL
MERCAPTAN
—*Purified*—
The ACCEPTED
standard
odorant
for liquefied
petroleum
gases.
MALLINCKRODT
CHEMICAL WORKS
ST. LOUIS NEW YORK

FOR HOME OVENS



OR ANNEALING OVENS



SINCLAIR LP-Gas is serving the war effort today in hundreds of ways in thousands of places. For home, transportation and industrial uses, Sinclair Butane and Propane continue to provide clean, safe, low-cost fuel.

The portability and adaptability of Sinclair LP-Gas has given it extra-value in war time, and naturally has resulted in steadily increased demands.

Sinclair is "all out" to meet both war and civilian requirements, by manufacturing the highest quality Propane and Butane.

Protect your fuel requirements by contracting with

•

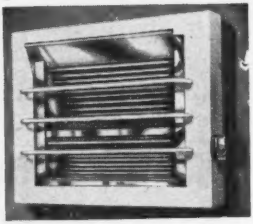
SINCLAIR PRAIRIE
OIL COMPANY
Liquefied Petroleum Gas Division
SINCLAIR BLDG., TULSA, OKLA.

EXTEND THE HEATING SEASON

SELL

RAFIRE WALL Heaters

★



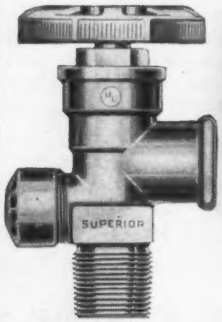
HUMPHREY RAFIRE No. 2

Used daily, even in mild weather, for bathrooms and chilly, hard-to-heat spots, the Humphrey Rafire Wall Heater No. 2 adds a payload of 7500 Btu per hour.

Sell this attractive, easy-to-install heater for handsome first profits, too. Send for full details.

GENERAL GAS LIGHT CO.
KALAMAZOO, MICHIGAN

Superior LP-GAS CYLINDER VALVES



Listed as Standard and for Re-examination Service By Underwriters' Laboratories

★

Write for Bulletin LP-8 For details on cylinder valves; and valves and accessories for bulk stations; above and below ground installations.

SUPERIOR VALVE & FITTINGS CO
1509 WEST LIBERTY AVENUE
PITTSBURGH, PENNSYLVANIA

CLASSIFIED

Classified advertising is set in 6-point type, without border or display, at the rate of 10 cents per word per insertion; minimum charge per insertion $2. Box numbers for replies count as 5 words. Count as a word each one letter word and each group of figures. Classified advertising is only accepted when payment accompanies order. Copy and payment must reach publisher's office prior to 10th of month preceding publication.

EQUIPMENT FOR SALE

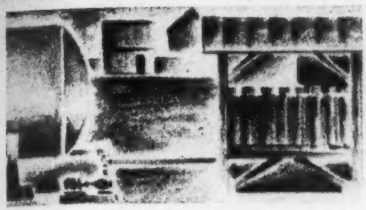
FOR SALE: NEW BUTANE STORAGE tank, A.S.M.E. Working pressure 105 lbs. 7/16 inch shell, 9/16 inch head, dehydrated, complete fittings, capacity L.P.G. 6040 gal. F. W. FESKE, Owner, Lindstrom, Minnesota.

Isobutane Plant Completed

Facilities for the recovery of 10,000 gals. for isobutane daily have been installed at Salem, Ill., for Sunflower Gasoline Corp.

Sunflower Gasoline Corp. and its affiliate, Sunflower Natural Gasoline Co., operate two natural-gasoline plants in the Salem field. Both plants are of the absorption type and have combined capacity of 165,000 gals. of natural gasoline daily and 82,500 gals. of liquefied petroleum gases. The isobutane plant was installed by the L. S. Gregory Co. of Tulsa, Okla.

HOT *Water* UNITED STATES
Automatic Water Heaters
Approved by A.G.A. for Liquefied Petroleum Gas
United States Heater Co.
COMPTON, CALIFORNIA



BOTTLING
Butane—Propane

For high pressure bottling service use the new Smith model 210. For truck mounting ask for model 211.

Balanced Gear Construction
Leak Proof Packing Box

Smith Butane - Propane Pumps are standard equipment with leading LP-Gas engineers and distributors.

SMITH PRECISION PRODUCTS CO.
1135 Mission St., So. Pasadena, Calif.

SPRAGUE METERS

for

PROPANE - BUTANE SERVICE

•

Write for Particulars

SPRAGUE METER COMPANY

Bridgeport, Conn.
Los Angeles, Calif.
San Francisco, Calif.

Are You in a Haze?

Many are when it comes to technical questions and new situations arising in the varied applications of liquefied petroleum gas, equipment and appliances. Maybe we can help you. If confronted by conditions you do not understand or problems that are beyond your experience, ask

BUTANE-PROPANE News

Research Department

for assistance. Our technical staff will gladly endeavor to answer all legitimate inquiries (except legal and financial) about the LP-Gas industry which regular subscribers choose to submit.

Use this sheet or your own letterhead.

Your Name.....

Your Position .....

Your Company.....

Your Address .....

.....

Your Question

.....

.....

.....

Mail to BUTANE-PROPANE News,
1709 W. 8th, Los Angeles, Calif.

ADVERTISERS

American Liquid Gas Corp..... 75
American Meter Co..... —
American Pipe and Steel Corp..... 58
Anchor Petroleum Co..... 69
Athens Stove Works, Inc..... —

Barber Gas Burner Co., The..... 66
Bastian-Blessing Co., The.....40, 41
Blickman, Inc., S..... 75
Blodgett Co, The G. S..... 69
Brodie Co., Inc.,Ralph N...Fourth Cover
Brunner Manufacturing Co..... 61
Butane Co., The 77

Caloric Gas Stove Works..... 3
Carter Oil Co., The..... 67
Cavalier Corp..... 63
Clute Petroleum Co..... 62
Commercial Shearing & Stamping Co., The..... 74

Dallas Tank & Welding Co., Inc.....55
Dearborn Stove Co..... 58
Downingtown Iron Works..... 63

Electric & Carburetor Engrg. Co..... 70
Ensign Carburetor Co., Ltd..... 46

Fisher Governor Co..... 56
Florence Stove Co..... —

Gas Equipment Co., Inc..... 66
Gas Equipment Supply Co..... 66
General Gas Light Co..... 78
Grand Ranges, Division of Cleveland Co-Operative Stove Co...36, 37

HANDBOOK BUTANE-PROPANE GASES 59
Hotstream Heater Co., The..... —

Kerotest Manufacturing Co..... 73

Mallinckrodt Chemical Works..... 77
McNamar Boiler & Tank Co..... 62
Merco Nordstrom Valve Co..... 1

National Butane Gas Co..... —

Ohio Foundry & Manufacturing Co., The 70

Parkhill-Wade ..... —
Payne Furnace & Supply Co..... 67
Peerless Manufacturing Corp..... —
Philgas Division, Phillips Petroleum Co. 71
Pitman, J. C. & Sons..... 71
Pittsburgh Equitable Meter Co..... 1
Pressed Steel Tank Co.....Second Cover

Ransome Co..... 45
Reliance Regulator Corp..... 71
Reznor Manufacturing Co..... 65
Robertshaw Thermostat Co..... 73
Rochester Manufacturing Co., Inc... 61
Roney, Inc., L. C..... 74
Roper Corp., Geo. D..... 52

Scaife Co.....Third Cover
Schoenberger Co., The W. J..... —
Servel, Inc. (Servel Electrolux)..... —
Sinclair Prairie Oil Co..... 77
Smith Meter Co..... —
Smith Precision Products Co..... 79
Sprague Meter Co..... 79
Superior Valve & Fittings Co..... 78

Tennessee Enamel Manufacturing Co. 75
Thomas Truck & Caster Co..... —
Tokheim Oil Tank & Pump Co..... 8

United States Heater Co..... 78

Viking Pump Co..... 73

Warren Petroleum Corp..... 65

SCAIFE CYLINDERS *last longer*

because they are STURDILY-BUILT

One of a battery of Forming Machines which smoothly roll flat steel into shells having uniform wall thickness. This prevents excessive internal strains in the metal.

The efficient, attractive Scaife Ellipsoidal cylinder heads are shaped by a method that maintains the full strength of the steel. (Below)

Precision workmanship and modern production methods are utilized in the Scaife ROLLED SHELL method of cylinder construction. A steel sheet of uniform thickness and known strength is rolled into a cylinder by a process that avoids internal strains and maintains the original thickness of material at every point.

Heads also are shaped by a method that maintains uniform wall thickness, and are inserted and integrally fused to the shell by a fillet weld, providing zones of extra strength at top and bottom, where rigidity means longer life.

Moreover, before shipment, every Scaife Cylinder is tested four times by four separate crews to make absolutely sure it is safe and dependable.

STURDILY-BUILT means LONGER LIFE!

After forming, Scaife cylinder shells are thoroughly cleaned in this pickling bath.

SCAIFE COMPANY

GENERAL OFFICES AND WORKS:
OAKMONT (Pittsburgh District), PA.
Representatives in Principal Cities

. . . IN MEASURING BUTANE

WITH BRODIMATIC DIRECT ERROR-PROOF READINGS

Patented "Snap-Action" Numeral Change

•

Large Legible "Plain View" Numbers

•

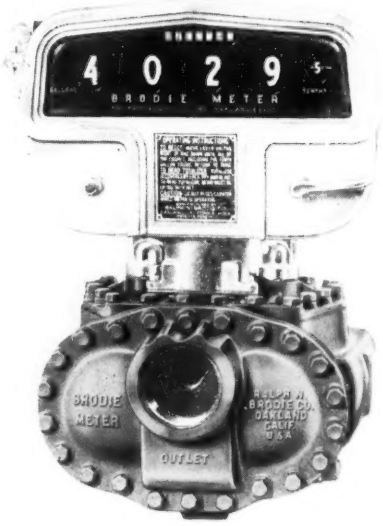
Simple Direct Totalized Readings

•

Eliminates "Guessed-at" Totals

•

Space Saving Compactness



With just one look or simply a glance, you'll have the right answer, for there's only one total—one answer, when Butane deliveries are measured with Brodie Meters and high-distance-spanning Brodimatic totalized readings. Brodimatic Direct Reading Counters are fully error-proofed. They eliminate "guessed-at-totals," dial compunctions and mental calculations.

Write today for full details.

RALPH N. BRODIE CO., INC.

945 61st Street, OAKLAND, CALIF., U.S.A. Cable Address: "BRODICO" • *Division Offices:* Chrysler Building, NEW YORK CITY • 59 East Van Buren, CHICAGO • 2809 Canton Street, DALLAS, TEXAS *Representatives and Stocks in All Principal Cities*

BRODIE METERS

BRODIMATIC DIRECT READING